More Mileage From Corn Silage

- Hybrid selection
- Management for yield AND quality
  - Population
  - Planting date
  - Row spacing
  - Soil fertility
  - Weed control
  - Irrigation
- Harvest
  - Timing
  - Cutting height
  - Special situations
    - Frost
    - Drought stress
    - Stalklage
- Ensiling
  - Feed-out problems
  - Inoculants and fermentation
Desirable Forage Characteristics

- What makes a good forage?
  - High yield
  - High energy (high digestibility)
  - High intake potential (low fiber)
  - High protein
  - Proper moisture at harvest for storage

- Ultimate test is animal performance
Wisconsin Corn Hybrid Silage Performance Trial Measurements

- **Agronomic**
  - Yield: Tons Dry matter / A
  - Moisture: %
  - Kernel milk stage: %

- **Quality (NIR)**
  - Crude protein: %
  - Acid detergent fiber: %
  - Neutral detergent fiber: %
  - In vitro true digestibility: %
  - Cell wall digestibility of stover: %

- **Performance index**
  - Milk per ton: The amount of milk production from one ton of silage using the quality measures. (Estimate is based on a standard cow body weight of 1350 pounds and milk production level of 90 pounds milk per day at 3.8 percent fat.)

  - Milk per acre = Milk per ton X Dry matter yield per acre
# Table 11. Southern Zone - Early Maturity Silage Trial

105 DAY RELATIVE MATURITY OR EARLIER, BASED ON COMPANY RATING

<table>
<thead>
<tr>
<th>BRAND</th>
<th>HYBRID</th>
<th>Yield</th>
<th>Moist</th>
<th>Milk</th>
<th>CP</th>
<th>ADF</th>
<th>NDF</th>
<th>IVD</th>
<th>CWD</th>
<th>MILK PER</th>
<th>TON</th>
<th>ACRE</th>
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<td>79</td>
<td>50</td>
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105-DAY HYBRID TRIAL AVERAGE ##

<table>
<thead>
<tr>
<th>BRAND</th>
<th>HYBRID</th>
<th>Yield</th>
<th>Moist</th>
<th>Milk</th>
<th>CP</th>
<th>ADF</th>
<th>NDF</th>
<th>IVD</th>
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<td>2320</td>
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<td>2</td>
<td>1</td>
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University of Wisconsin - Madison
Normalized Corn Hybrid Silage Yield and Quality During 1990-1999 in Wisconsin

Lauer University of Wisconsin - Madison
Corn Specialty Hybrid Silage Yield and Quality During 1990-1999 in Wisconsin

Lauer University of Wisconsin - Madison
Whole-plant

\[ y = 0.76x + 2.90 \]

\[ R^2 = 0.93 \]

Stover

\[ y = 0.25x + 2.12 \]

\[ R^2 = 0.93 \]

Figure 1. Relationship between corn forage dry matter yield and era of release for whole-plant and stover.
Figure 4. Relationship between corn forage neutral detergent fiber concentration and era of release for whole-plant and stover.

\[
y = -12.8x + 511 \\
R^2 = 0.87
\]
Figure 6. Relationship between corn forage in vitro true digestibility and era of release for whole-plant and stover.
Figure 7. Relationship between corn forage milk yield/quality and era of release.

- Milk yield: $y = 42.8x + 627$, $R^2 = 0.88$
- Milk quality: $y = 2208x + 4662$, $R^2 = 0.94$
Criteria for Selecting Silage Hybrids

- Grain yield: allows flexibility (dual purpose)
- Whole plant silage yield
- Relative maturity: 5-10 days later than grain hybrids
- Standability: allows flexibility
- Pest resistance
- Silage quality

“Variation for silage yield and quality exists among commercial hybrids in Wisconsin.”
Corn Silage Yield and Quality Changes During Development

Milk per Acre (lb/A) vs Milk per Ton (lb/T)

- Pioneer 3578
- Arlington, WI - 1993

Harvest date:
- Jul 11 (V11)
- Jul 21 (V14)
- Jul 31 (R1)
- Aug 10 (R2)
- Aug 20 (R3)
- Aug 30 (R4)
- Sep 10 (R5)
- Sep 21 (R5.5)
- Oct 5 (R5.8)

Lauer University of Wisconsin - Madison
Corn Silage Yield and Quality Response to Planting Date

- **Full-season (108 d)**
- **Mid-season (98 d)**
- **Short-season (85 d)**

Milk per Acre (lb/A)

May 11  | May 31  | June 22 | July 11
---|---|---|---
Arlington, 1994

University of Wisconsin - Madison
Relationship between corn silage yield and plant density in Wisconsin (1994 to 1996)

Average of six locations

Silage yield (T/A)

Harvest plant density (number/A)

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Relationship between corn silage Milk per Ton and plant density in Wisconsin (1994 to 1996)

Average of six locations

Milk per Ton (lb/T)

Harvest plant density (number/A)

18000 24000 30000 36000 42000

Lauer University of Wisconsin - Madison
Relationship between corn silage Milk per acre and plant density in Wisconsin (1994 to 1996).

Average of six locations

Milk per Acre (lb/A) vs. Harvest plant density (number/A)

Lauer University of Wisconsin - Madison
Corn Silage Yield (T/A) Response to Row Spacing in Wisconsin

Lauer University of Wisconsin - Madison
Relative change in silage yield and quality at different cutting heights during 1996

- Silage yield
- Milk per Ton
- Milk per acre

Percent Change (%)

Cutting height (inches):
- 6
- 12
- 18

University of Wisconsin - Madison
Relationship between whole plant moisture and kernel milk stage (1990 - 1999)

Whole plant moisture (%) vs Kernel milk stage

n = 1896

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Lauer
Silage drydown in Manitowoc County, WI.

- **1996**: $y = -0.4x + 164$, $R^2 = 0.77$
- **1997**: $y = -0.6x + 223$, $R^2 = 0.96$
- **1998**: $y = -0.6x + 204$, $R^2 = 0.91$

Sample dates:
- 22-Aug
- 29-Aug
- 5-Sep
- 12-Sep
- 19-Sep
- 26-Sep
- 3-Oct
Kernel milk “triggers” for timing silage harvest

<table>
<thead>
<tr>
<th>Silo structure</th>
<th>Recommended moisture content for ensiling</th>
<th>Kernel milk stage &quot;trigger&quot;</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Horizontal bunker</td>
<td>70 to 65</td>
<td>80</td>
</tr>
<tr>
<td>Bag</td>
<td>70 to 60</td>
<td>80</td>
</tr>
<tr>
<td>Upright concrete stave</td>
<td>65 to 60</td>
<td>60</td>
</tr>
<tr>
<td>Upright oxygen limiting</td>
<td>60 to 50</td>
<td>40</td>
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</table>

"trigger": kernel milk stage to begin checking silage moisture
Silage moisture decreases at an average rate of 0.5% per day during September