What Does Your Forage Customer Want?

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What Do Forages Provide?
Why Do Cows Need Fiber?
Forages

- Foundation upon which nutritionally sound and economical dairy rations are built
- High quality forage = less grain & better income over feed cost
- Forage quality impacts intake, milk production and animal health
- Are the primary source of “effective” fiber
Use the Feed Pyramid to think about how rations should be formulated and cows fed. A basic ration with high quality forages (bottom three sections of pyramid) should support up to 75 lbs (or more) of milk per day. Fats, bypass proteins and feed additives are needed by higher producing cows and should top off the base ration.
What Does Your Forage Customer Want?
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- A consistent supply of
  - High quality
  - High digestibility
  - “Effective” physical fiber
  - Palatable
  - Well-fermented silage
Effect of Maturity on Forage Quality

- Energy
- AND
- Protein

Early Maturity

Late Maturity

NDF (Fiber)
“Your nutritionist is only as good as your forage”

- Dairy producer
- Western New York
- 900 cows
How Important is Forage Quality?

- Kawas et. al., Univ. of Wisconsin
- Used alfalfa hay
- 4 stages of maturity
- 4 ratios of forage to grain
- Short-term trial
Milk Production as Affected by Hay Quality

- Pre Bloom
- Early Bloom
- Mid Bloom
- Full Bloom

![Graph showing milk production vs. % hay](image-url)
Alfalfa Maturity - Conclusions

- Feeding increased grain **could not** overcome the effects of lower forage quality.
- Milk decreased about 1 lb./day for each day increase in maturity after prebloom.
- Milk decreased by 1 lb./day for each 1% increase in alfalfa NDF content.
How Important is Forage Digestibility?

- Data from 23 research trials
- Alfalfa hay, alfalfa silage, corn silage, timothy silage, wheat silage
- Reported NDF dig. (in situ or in vitro)
- High NDF dig. = 62.9%
- Low NDF dig. = 54.5%

Oba & Allen – Michigan State - 1999
DMI & Milk Production

![Bar chart showing DMI, Milk, and 4% FCM production for High and Low dNDF diets.](image)
Summary -

- 1 unit of increased NDF digestibility (i.e. 45 to 46%) =
  - + 0.37 lbs. DMI
  - + 0.51 lbs. milk
  - + 0.55 lbs. 4% FCM
- This may not be a linear response across all levels of NDF digestibility
The relationship between corn silage NDF and digestible NDF.
How Much Does Forage Digestibility Vary?

- In vitro data from Dairy One
- Samples from 5/04 through 4/05
- 30 hour incubation time
- Graph has average plus or minus 1 standard deviation
- This represents about 2/3 of the total samples
In Vitro 30-Hour NDFD Data

![Bar chart showing NDFD data for Leg. Sil., Grass Sil., and Corn Sil.](image)
### Forage Quality Goals

<table>
<thead>
<tr>
<th>Forage</th>
<th>NDF,</th>
<th>NDFD, %</th>
<th>Starch, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>39 – 44</td>
<td>48</td>
<td>-</td>
</tr>
<tr>
<td>Grass</td>
<td>50 – 55</td>
<td>61</td>
<td>-</td>
</tr>
<tr>
<td>Corn silage</td>
<td>40 – 45</td>
<td>49</td>
<td>30 - 35</td>
</tr>
</tbody>
</table>
## Forage Particle Size Guidelines

<table>
<thead>
<tr>
<th>% of Sample</th>
<th>Forages</th>
<th>TMR’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top screen</td>
<td>15 – 25</td>
<td>8 – 14</td>
</tr>
<tr>
<td>Pan (fines)</td>
<td>&lt; 50</td>
<td>&lt; 50</td>
</tr>
</tbody>
</table>
How Much Forage Can we Feed?

- Depends on
  - Quality (NDF level)
  - Digestibility
  - Particle size
  - Inventory (how much is available)
  - Feedbunk management

- Animal body weight, milk production
Field Observations

- In the last 5-10 years, the quantity of forage fed in many New York dairy herds has increased.

- Why?
  - Improved forage quality
  - Greater quantities of forage available? (more tons/acre)
  - Better hybrids and varieties
  - Herd health and acidosis problems?
  - New forage tests (digestibility, fermentation profiles, starch)
High Forage Feeding Herds - Survey

- Information provided by feed professionals working with the herd
  - *Information is for 1 point in time for these herds!!*
- All are Holstein herds
- None of these are pasture herds (difficult to obtain forage DMI data)
- Data is from 16 herds
Survey Data - 2

- Herd size - 56 to 550 cows
- 11 herds milk 2x, 5 herds milk 3x
- Daily milk ranges from 68 to 100+ lbs. of milk/cow/day
- Milk fat ranges from 3.4 to 4.1
- Milk true protein ranges from 2.9 to 3.3
- Herd health data was not collected
Forage, % of Ration DM
F-NDF Intake, % of BW
Key Point!!

- What’s needed to make high forage diets work:
  - Adequate quantity of forage
  - Consistent, high quality forage

- High forage diets don’t work with inconsistent forage quality
Dairy Producer Comments

- Better milk components
- Less acidosis and foot health problems
- Lower culling rate
- Lower veterinary bills
- Increased number of lactations/cow
Why Use FNDF to Set Ration Forage Levels?

- Cows have a limited capacity for ingestion, chewing and rumination of forages.
- Cows will spend about 8-10 hours/day for chewing & rumination activity
- Cows chew more as FNDF increases
- Rate of passage is slower for higher NDF forages
Figure 1. Pounds of Forage NDF Needed Per Day

- 0.9% BW
- 1% BW
- 1.1% BW

BW, lbs. vs. FNDF, lb
How Many lbs. of Forage DM to Feed?

![Graph showing F-NDF Intake vs lbs DM]

- F-NDF Intake, % of BW
- lbs DM
- 0.85
- 0.95
- 1.05

Legend:
- 40
- 50
- 60
Yearly Tons of Forage Needed/Cow

![Bar chart showing the yearly tons of forage needed per cow for different FNDF% values. The chart compares 'Cow' and 'Field' conditions.]
**Summary**

- Many dairy herds have the potential to improve herd health and profitability by feeding higher levels of forage.
- Some farms produce (or buy) high quality forage but don’t feed it to advantage.
- Forage inventory will limit the quantity of forage fed on many farms.
Case Farm Continued…