Feed Classifications
Part I
AG 240
Forages and/or Roughages

Definition: Vegetable material in a fresh, dried or ensiled state (pasture, hay, silage, respectively).
General Characteristics of Forages

- Less digestible than concentrates
- High in Fiber
  - Generally more than 18% CF
- Low in Energy
Examples of Forages

Low Moisture
- Legume hays
- Grass hays
- Straws
- Fodder (stalks)
- Stovers (stalks)
- Hulls and shells
More Examples of Forages

High Moisture

- Silage
  - Produced from green forage crops that are compressed and stored under anaerobic conditions.
  - 60-75% moisture

- Haylage
  - Intermediate between silage and hay
  - 40-60% moisture

- Grazed forages
Concentrates
General Characteristics of Concentrates

- High in Energy
- Low in Fiber
- Highly digestible (80-90%)
- Generally less than 20% CP
- And less than 18% CF
Examples of Concentrates

- Cereal grains
- Beet and citrus pulp
- Nuts
- Roots and tubers
- Liquids (molasses, fats, oils)
Protein Supplements

Definition: Contains more than 20% protein
Examples of Protein Supplements

Plant origin
   SBM, CSM, LSM, Legumes
   Brewery and distillery by-products
Animal Origin
   Bone, blood, fish, chicken litter, feather, dried milk products
NPN
   Urea, DPW
Notes on Protein Supplements

- Molasses is commonly used as a base
- Soybean meal (SBM) is most widely used
- Cotton seed meal (CSM) used in south
Feed Additives
Categories of Feed Additives

- Vitamins
  - Yeast, fish oils, wheat germ oil
- Minerals
  - Bone meal, calcium carbonate, limestone
- Non-nutritive supplements
Examples of Non-nutritive feed additives

- Buffers
- Ionophores
- Antibiotics
- Flavors
- Enzymes
- Hormones
In depth look at each feed classification
Forages and Roughages

Vegetable material in a fresh, dried or ensiled state (pasture, hay, silage, respectively)

56% of all feed fed to livestock
Review Characteristics

- NRC Classification
  - > 18% CF
  - Less than 70% TDN

- Mineral content is quite variable
Mineral Content

- K found in highest concentrations
- Legumes are high in Ca
- Mg is supplied in adequate quantities
- P is moderate to low
- Higher in Ca, lower in P than energy feeds (concentrates)
More characteristics...

- Lower in digestibility than concentrates due to lignin
  - Amount of lignin is inversely related to digestibility of roughage
- Good source of fat soluble vitamins
- Extremely variable in crude protein
  - Alfalfa can be > 20% CP
  - Straw < 4%
What is the difference between a grass and a legume?
Grass vs Legume

- Grasses use soil nitrogen (fertilizer)
- Legumes have the ability to convert nitrogen present in the air into crude protein

Nutrient content is greatly affected by the stage of maturity at which it is harvested or consumed
Nutrient trends of Grass

- All have high levels of K
- Higher in Mn and Zn than legumes
- Levels decline with maturity
Problems associated with Grasses

- **Glycosides**
  - Sorghum converts this to prussic acid

- **Cyanogenic glycosides**
  - Sorghum converts this to cyanide

- **Oxalate**
  - Causes Mg deficiency

- **High Nitrate levels**
Nutrient trends of Legumes

- All have high levels of K
- Higher in Ca, Mg, S and frequently Cu than grasses
- Levels decline with maturity
Problems associated with Legumes

**Bloat**
- Grazing legumes produce more bloat than consuming legume hays

**Coumarin**
- Found in clovers and moldy hay
- Converted to dicoumarin which interferes with blood clotting
Relative Feed Values of various forages

RFV = relative value of hay which takes into account differences in consumption and digestibility as affected by maturity

<table>
<thead>
<tr>
<th>Forage</th>
<th>CP</th>
<th>ADF</th>
<th>NDF</th>
<th>RFV</th>
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<tbody>
<tr>
<td>Alfalfa, prebud</td>
<td>23</td>
<td>28</td>
<td>38</td>
<td>164</td>
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<tr>
<td>Alfalfa, bud</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>152</td>
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<tr>
<td>Alfalfa, mid-bloom</td>
<td>17</td>
<td>35</td>
<td>46</td>
<td>125</td>
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<tr>
<td>Alfalfa, mature</td>
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<td>41</td>
<td>53</td>
<td>100</td>
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<tr>
<td>Brome, late vegetative</td>
<td>14</td>
<td>35</td>
<td>63</td>
<td>91</td>
</tr>
<tr>
<td>Brome, late bloom</td>
<td>8</td>
<td>49</td>
<td>81</td>
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</tr>
<tr>
<td>Bermuda grass, early</td>
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<td>32</td>
<td>70</td>
<td>85</td>
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<tr>
<td>Bermuda grass, late</td>
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<td>78</td>
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<td>Fescue, late vegetative</td>
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<td>Orchard grass, early</td>
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<tr>
<td>Orchard grass, early</td>
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<td>Wheat straw</td>
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Source: Holland and Kezar (9).