Cattle and Horse Nutrition

Dona Goede
Livestock Specialist

Introduction

• Many health, reproductive and production problems can be prevented with good nutrition.
• Poor nutrition results in:
  – Poor conception rates
  – Lower calf crop
  – Poor weaning weights
  – Difficult births
  – Higher feed bills because of over feeding
  – More infectious disease due to decreased immune system protection

Introduction

• A lot of research has gone into the development of feeds that give animals exactly what they need to remain healthy and to perform at their peak.
• As animals grow and mature, their nutritional needs change.
• Younger animals need diets high in protein.
• As the animal matures, the animal needs a diet higher in carbohydrates.
• Breeding animal’s nutritional needs change according to their production cycle.

Stage of Production

Calving to breeding
Breeding to weaning
Mid Gestation
Late Gestation

Nutritional Requirements

• Highest
• Moderate
• Lowest
• High

Six Major Classes of Nutrients

• Water
• Protein
• Carbohydrates
• Fats
• Vitamins
• Minerals

Water

• Water is the cheapest nutrient. It provides the basis for all fluid in the animal’s body.
• Water is used in the blood supply.
• Digestion requires moisture for the breakdown of nutrients.
• Water is needed in the movement of feed through the digestive track and in flushing the animal’s body of waste.
• Water is needed to produce milk.
• It helps regulate the animal’s body temperature.
Water

- Over 80% of the animal’s body is composed of water.
- A loss of 20% will result in death of the animal.
- Animals generally need about 3 pounds of water for every pound of solid feed they consume.
- The average cow will consume 12 gallons of water per day.
- Some water comes in the feed itself, such as in succulent green pasture forages and silage.

Water

- Animal’s water needs change.
- A horse working hard in hot weather will need more water intake to replenish water lost.
- An animal that is lactating requires a lot more water to produce milk for its young.

Protein

- Protein is composed of compounds called amino acids.
- Amino Acids are used to build muscle, skin, hair, bones, and body tissues.
- All of the enzymes and many hormones in the bodies of animals are composed of proteins.

Protein

- As is the case with water, some animals need more protein in their diets than do others.
- Young rapidly growing animals need more protein than do mature animals.
- A cow that is giving large amounts of milk needs more protein than an animal that is not lactating.
- There are over 20 different types of amino acids.
- There are ten that are essential that the animal must obtain from its feed.

Carbohydrates

- The main source of energy from animals comes from carbohydrates.
- They include sugars, starches and cellulose.
- Carbohydrates come from plants. By weight, plants are composed of about 75% carbohydrates.

Sources of Carbohydrates

- The most important source of carbohydrates for animals is grain.
- Grain is also known as concentrates because of the high concentration of carbohydrates which are high in energy.
- Forages fed to animals are called roughages because of the amount of fiber in the diet. Roughages are generally low in net energy.
**Fats**

- Fats are found in both plants and animals.
- They contain about 2.25 times the energy of carbohydrates.
- They serve as concentrated storage places for excess energy.
- When the body does not take in enough energy to perform the normal functions, these reserves of fat are used.

**Minerals**

- Although they provide only a small portion of the total feed intake, they are vitally important.
- Bones are formed by a combination of calcium and phosphorus.
- Minerals aid in the construction of muscles, blood cells, internal organs and enzymes.
- Animals with a deficiency in minerals never develop properly and are more susceptible to disease.

**Macro Minerals**

- There are seven essential macro minerals:
  - Calcium
  - Chlorine
  - Magnesium
  - Phosphorus
  - Potassium
  - Sodium
  - Sulfur

**Micro Minerals**

- There are nine essential micro minerals:
  - Cobalt
  - Copper
  - Fluorine
  - Iron
  - Iodine
  - Manganese
  - Molybdenum
  - Selenium
  - Zinc

**Fats**

- Certain acids referred to as essential fatty acids are also derived from fats.
- These acids are necessary for the production of some hormones.
- The most important sources of fats in feed for agriculture animals are the grains that contain oil, such as corn and soybeans.
Minerals

- Minerals make up 3-5% of the body.
- Of that 3-5%, calcium makes up one-half of the body’s minerals.
- Phosphorus makes up about one-fourth of the body’s minerals.
- Calcium and phosphorus make up the largest portion (75%) of the total mineral content in the body.

Minerals

- Minerals are often fed free choice. Animals are given free access to the minerals and allowed to eat all they want.
- This is done in a mineral box or trough or by using salt blocks.
- Essential minerals are in the block and the animals take in the minerals as they lick the block for salt.

Vitamins

- Vitamins are used in small amounts but are essential for life.
- They are used in the normal body processes of growth, production, and reproduction.
- They are vitally important in providing the animal with the ability to fight stress, disease and maintain good health.

Vitamins

- There are 16 known vitamins.
- The B vitamins and vitamin C are water soluble.
- Fat soluble vitamins are A, D, E, and K.

General Considerations of Nutrition

- Natural forage eaters
- Forages (pasture/hay) first line of meeting nutritional requirements
- Balanced diet dependent on increased physical demands

Body Condition Scoring

- 3.5
- 7
**Requirements**

<table>
<thead>
<tr>
<th>Body Wt. (Lb.)</th>
<th>Daily Feed (Lb.)</th>
<th>Protein</th>
<th>TDN</th>
<th>CA</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mature Horses at Rest</td>
<td>1100</td>
<td>13.1</td>
<td>69</td>
<td>0.34</td>
<td>0.26</td>
</tr>
<tr>
<td>Mature Horses at Light Work</td>
<td>1100</td>
<td>17.5</td>
<td>69</td>
<td>0.25</td>
<td>0.18</td>
</tr>
<tr>
<td>Mature Horses at Medium Work</td>
<td>1100</td>
<td>22.9</td>
<td>69</td>
<td>0.2</td>
<td>0.13</td>
</tr>
<tr>
<td>Mares, Last 30 Days of Pregnancy</td>
<td>1100</td>
<td>13.7</td>
<td>69</td>
<td>0.45</td>
<td>0.35</td>
</tr>
<tr>
<td>Mares, Peak of Lactation</td>
<td>1100</td>
<td>22.1</td>
<td>69</td>
<td>0.6</td>
<td>0.45</td>
</tr>
</tbody>
</table>

**Nutrients of Hay**

<table>
<thead>
<tr>
<th>Hay Type</th>
<th>Protein</th>
<th>TDN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>20.0</td>
<td>60.8</td>
</tr>
<tr>
<td>Bermuda</td>
<td>16.0</td>
<td>56.3</td>
</tr>
<tr>
<td>Timothy</td>
<td>12.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Ryegrass</td>
<td>17.3</td>
<td>61.3</td>
</tr>
</tbody>
</table>

**Critical Factor**

**ENERGY!**

**Is there a difference in hay quality?**

<table>
<thead>
<tr>
<th>Hay Type</th>
<th>Protein</th>
<th>TDN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>20.0</td>
<td>60.8</td>
</tr>
<tr>
<td>Excellent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>8.0</td>
<td>36.9</td>
</tr>
<tr>
<td>Bermuda</td>
<td>16.0</td>
<td>56.3</td>
</tr>
<tr>
<td>Excellent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>6.0</td>
<td>40.7</td>
</tr>
</tbody>
</table>

**Other differences**

- Blister Beetles – Mostly in Alfalfa Hay
- Mold
- Poisonous Plants
- Fescue Toxicity
Poisonous Plants

- G4970-Plants Poisonous to Livestock
- http://www.ansci.cornell.edu/plants/index.html

Any Questions?