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 6-17

Relative feed values of various forages

Forage	*CP*	*ADF*	*NDF*	*RFV*
Alfalfa, prebud	23	28	38	164
Alfalfa, bud	20	30	40	152
Alfalfa, mid-bloom	17	35	46	125
Alfalfa, mature	15	41	53	100
Brome, late vegetative	14	35	63	91
Brome, late bloom	8	49	81	58
Bermuda grass, early	12	32	70	85
Bermuda grass, late	8	43	78	66
Fescue, late vegetative	12	36	64	88
Fescue, early bloom	10	39	72	76
Orchard grass, early vegetative	18	31	55	109
Orchard grass, early bloom	15	34	61	95
Wheat straw	4	54	85	51

Source: Holland and Kezar (9).