

# **Feeds and Feeding for Ruminants and Horses**

## **Clinical Medicine I VETM\*3430**

**By the end of the lecture and lab students will be able to:**

- **identify the common forages (roughages) fed to large animals and be able to explain their physical and nutrient characteristics:**
  - hay – major types are either *grass* or *legume* hay
    - hay is harvested immature to optimize nutrients (less non-digestible components than in a mature plant)
    - nutrient dense components (energy and protein) of plant are found mostly in the leaves and seeds.
    - Stem cell wall provides main fiber source, also energy and protein to a lesser extent (through rumen microbial fermentation)
    - legume hay is typically more nutrient dense than grass hay because it has more leaves and seeds relative to stem.
    - Can be stored as dry bales or fermented and stored as silage.
  - corn silage
    - consists of whole plant i.e. stalk, leaves, corn cob and grain.
    - A good fiber source with high energy value (corn grain) but low protein
    - is always stored as a chopped, fermented feed i.e. silage
  - straw
    - Stem of a grain plant (e.g. wheat, oats, barley) after harvest
    - Low nutrient value as is at full maturity and it has lost leaves and seeds (the grain)
    - Stored as dry bales
    - Mostly used for bedding, can be fed to cattle as an added fiber source.
- **know the common grains fed and know the factors that affect their rate of digestion:**
  - Grains:

Most common grains are; Barley, Oats, Wheat and Corn  
They are the seed of the plant.

    - Barley, oats and wheat commonly referred to as the cereal, or small grains
    - Starch is highest proportion of CHO in the seed, which is a readily digestible source of energy
  - Factors:

Physical form (whole, ground, cracked, crimped, flaked)  
- the more processed, the higher the rate of digestibility

Moisture Content  
- the higher the moisture, the higher the rate of digestibility
- **know and be able to explain the differences in harvesting, storage methods and dry matter content of these common feeds:**
  - hay
    - dry hay
      - harvested full length as square or round bales
      - about 10 -12 % moisture
  - Baleage

- harvested full length as round bales
  - a fermented feed so is wrapped in plastic to exclude oxygen (i.e. baled silage)
  - Stored between 40 -60% moisture
- haylage
  - is chopped at harvest for storage
  - is a fermented feed (i.e. hay silage)
  - stored between 40 -60 % moisture
- 1<sup>st</sup> cut vs 2<sup>nd</sup> cut
  - 1<sup>st</sup> cutting of year usually June, July – 2<sup>nd</sup> cut and August 3<sup>rd</sup> cut.
  - 1<sup>st</sup> cut has highest yield, but 2<sup>nd</sup> and 3<sup>rd</sup> cuts usually more nutrient value, but less volume, because mostly comprised of legume hay.
- mow vs conventional upright silo vs sealed upright silo vs bunk silo
  - mow – storage of dry hay bales, typically upper story of bank barn
  - silos – stored as silage (fermented plant material)
    - upright silo = top unloading
    - sealed upright = bottom unloading
    - bunk silo = horizontal face removal
- grains (corn, oats, barley, wheat)
  - silage (most commonly corn)
  - about 65% moisture
- high moisture
  - corn grain only , about 40% moisture
- dry grain
  - stored dry, about 10 -12% moisture
- bin vs conventional upright silo vs sealed upright silo vs bunk silo
  - bin is for dry corn storage, silos for high moisture or silage
- **know which major nutrient(s) [energy, protein, fiber] is/are provided by each of the commonly fed feeds:**
  - hay
    - moderate fiber, energy, protein (varies with grass vs legume and cutting)
  - corn silage
    - high fiber, energy, low protein
  - cereal grains
    - high energy, moderate protein, low fiber
  - corn grain
    - high energy, low protein
  - soybeans/soybean meal
    - high protein (main protein supplement source), high energy
- **know the different forms of mineral that is fed:**
  - Granular
    - typically mixed into a grain mix or for cattle, added to the TMR ration
  - Blocks
    - often provided to pastured animals in addition to salt licks
  - Supplements
    - all commercial supplements contain added minerals

## Specific points for Ruminants:

- **explain the differences between the following types of feeding systems:**
  - **component fed rations**
    - grain/supplement (energy/protein) fed separately from roughages
    - 2 to 4 grain/supplement feedings per day fed at each stall
  - **total mixed rations (TMR's)**
    - all feed components stored separately but mixed together in specific proportions
    - mixed daily and fed free-choice at a bunk
- **explain the significance of order of feeding to rumen function.**
  - feed roughages to stimulate chewing and salivation to buffer the rumen
  - feed highly fermentable feeds (grain) in smaller amounts in 3- 4 meals to minimize rumen pH depression and possible rumen acidosis
- **estimate the daily *dry matter intake* (DMI) of a cow at maintenance vs production.**
  - maintenance DMI is about 2% of body weight per day
  - milk production demands increase DMI to about 3 -4 % of body weight per day
- **estimate the daily water intake of a cow.**
  - at maintenance about 40 litres per day (higher in warmer weather) for a 650 kg cow
  - milk production increases water intake to about 3 litres of water for every litre of milk

## Specific points for Horses:

- **know the approximate dry hay and water intakes for a horse at maintenance**
  - hay requirement is about 2% of body weight
  - between 20-30 litres per day per 450kg inactive horse, room temp
- **know the different ways that hay may be fed and explain their rationale for use**
  - dry hay best fed on floor/ground as horses are grazing animals
  - hay cubes commonly fed as they are convenient and not dusty
    - can be soaked for older horses
  - wetting of hay if dusty – soak for 10 min.
  - hay net/wall manger
  - hay in an outside feeder with groups of horses.
- **identify common grains fed to horses:**
  - whole oats (Western oats have more selenium, Ont. is deficient)
  - crimped oats-cracks the hulls so is more digestible
  - sweet feed, highly palatable because molasses added to the grain.
- **identify the types of common commercial feeds and know the reasons for feeding**
  - roughage chunks- larger format than pellets, so take longer to eat
  - beet pulp- must be soaked
  - pelleted supplements are fed based on activity level, therefore nutrient requirements. (can be purchased as foal, senior, broodmare or performance rations)
- **know what bedding is commonly used for horses:**
  - straw
  - shavings-softwood pine
  - sawdust-beware of black walnut contamination
  - sawdust pellets-need to wet
  - peat moss – must be moistened
  - shredded paper – uncommon