Horse Nutrition and Feeding

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Let us first compare the feed profile of poultry, ruminant and horses

- In terms of feedstuffs;

- Poultry feed contains fully concentrated feeds.

- Ruminants feed both roughage and concentrated feeds. (%100 roughage, or % 20 roughage % 80 concentrated feeds DM, feed consumption)

- In the feeding of horses both roughage and concentrated feed included. % 50 roughage % 50 concentrated feeds DM)

Let us first compare the feed profile of poultry, ruminant and horses

- **meeting energy and nutrient requirements;**

It is sufficient to meet the energy and nutrient requirements (except protein) in the feeding of poultry. However, the requirements for protein must be met in terms of both numerical and essential amino acids.

- It is sufficient to meet the energy and nutrient requirements in the nutrition of ruminants. However, especially in high-yielding animals, protein levels should be considered and feeds with higher feeds should be made for by-pass protein.

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Let us first compare the feed profile of poultry, ruminant and horses

- **meeting energy and nutrient requirements;**
  It is sufficient to meet the energy and nutrient requirements (except protein) in the feeding of horses. However, the requirements for protein must be met in terms of both numerical and essential amino acids.

- With this aspect,
- it is similar to the feeding with horse feed.

Let us first compare the feed profile of poultry, ruminant and horses

- **In terms of feed consumption;**

In poultry feed, feeds are kept in front of ad libitum.

- Ruminats should be given twice daily (morning-evening) feeds.

- Horses should be fed at least twice a day or even three times a day (morning-evening-night) feeds.
- Horses should be fed less often (because stomach capacity is relatively small compared to ruminants)

Horse Nutrition Basics

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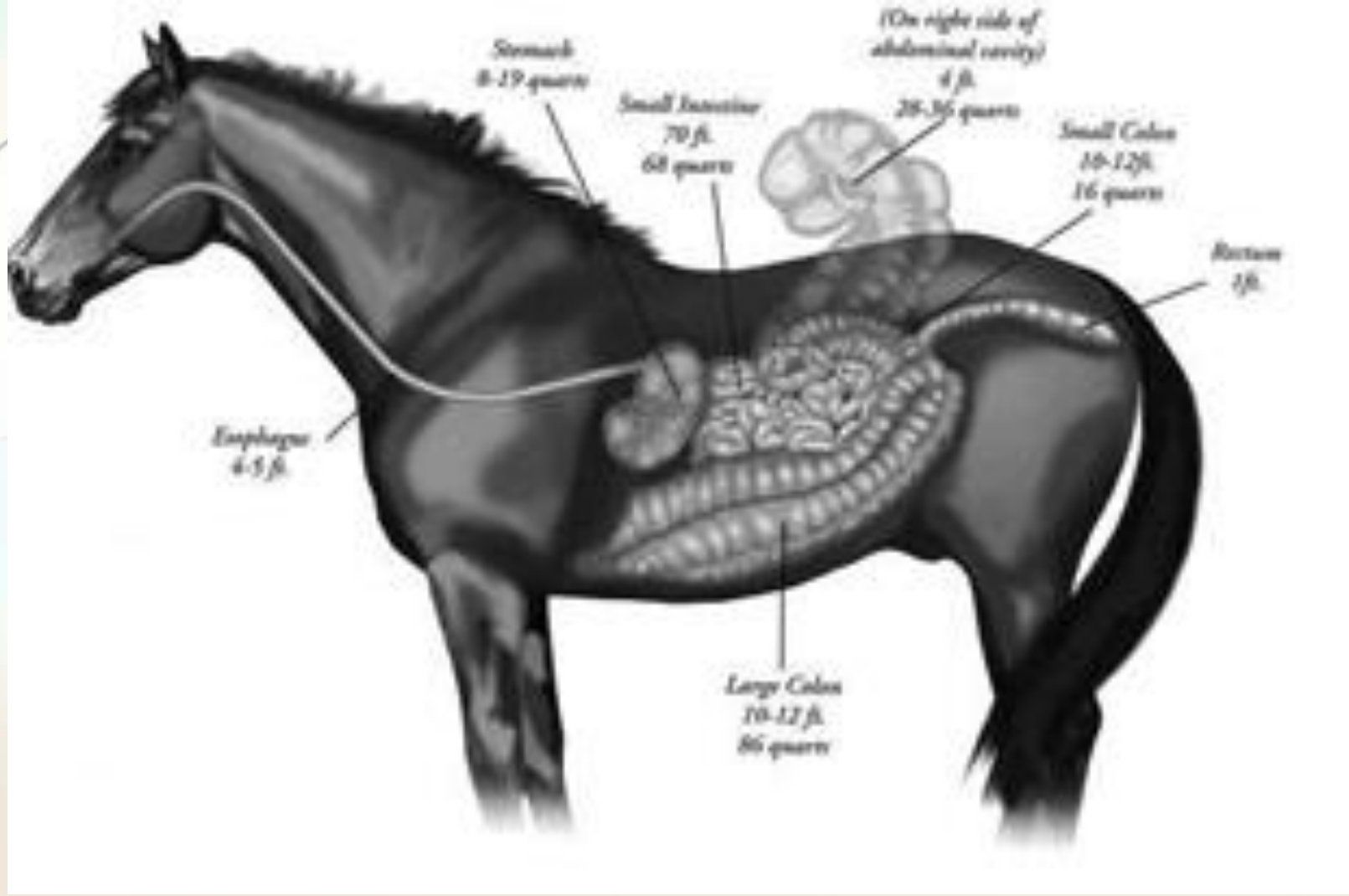

Digestive System Of A Horse

Large Caecum and intestine, small stomach.

Designed for a high fibre diet, low in soluble carbohydrate and no sudden changes in diet.

Evolution

Evolved on prairie/rangeland

10-20 km travel per day

Diet: high fibre, high in minerals, low protein. Energy mainly from volatile fatty acids not glucose.

Lower fibre,high soluble carbs are good for cows, meat and milk production, not for horses

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So whats wrong with high soluble carbs/low fibre?

Digestive disturbances, rapid fermentation

Metabolic disorders, behavioural problems

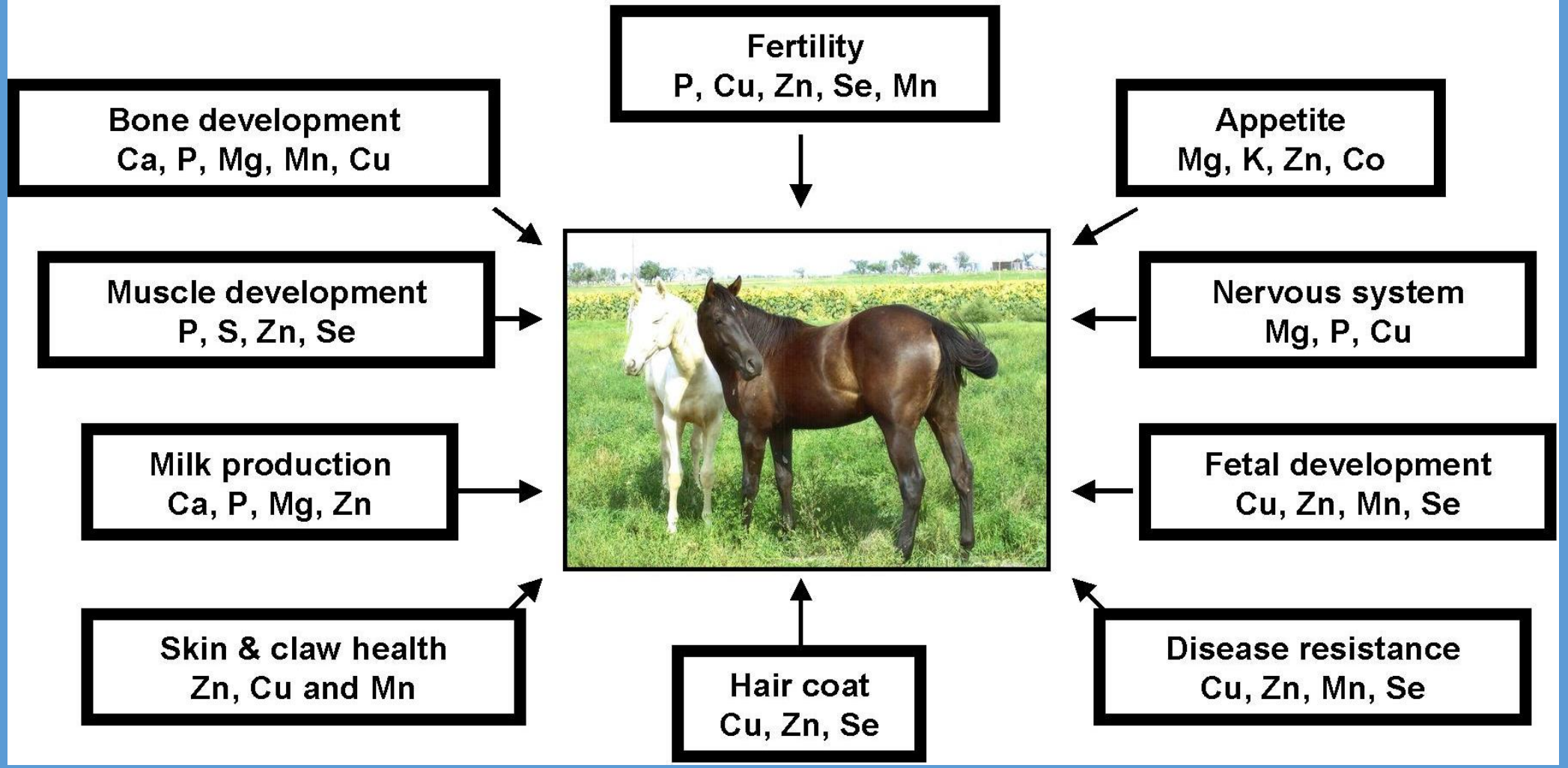
Acidosis, increased risk of laminitis and colic

Can Pasture be a sole diet?

It can be too good!

It can provide enough energy and protein

But what about vitamins and minerals? Pasture vitamins and minerals can not fully meet the need



The mechanisms of action of some mineral substances in the body

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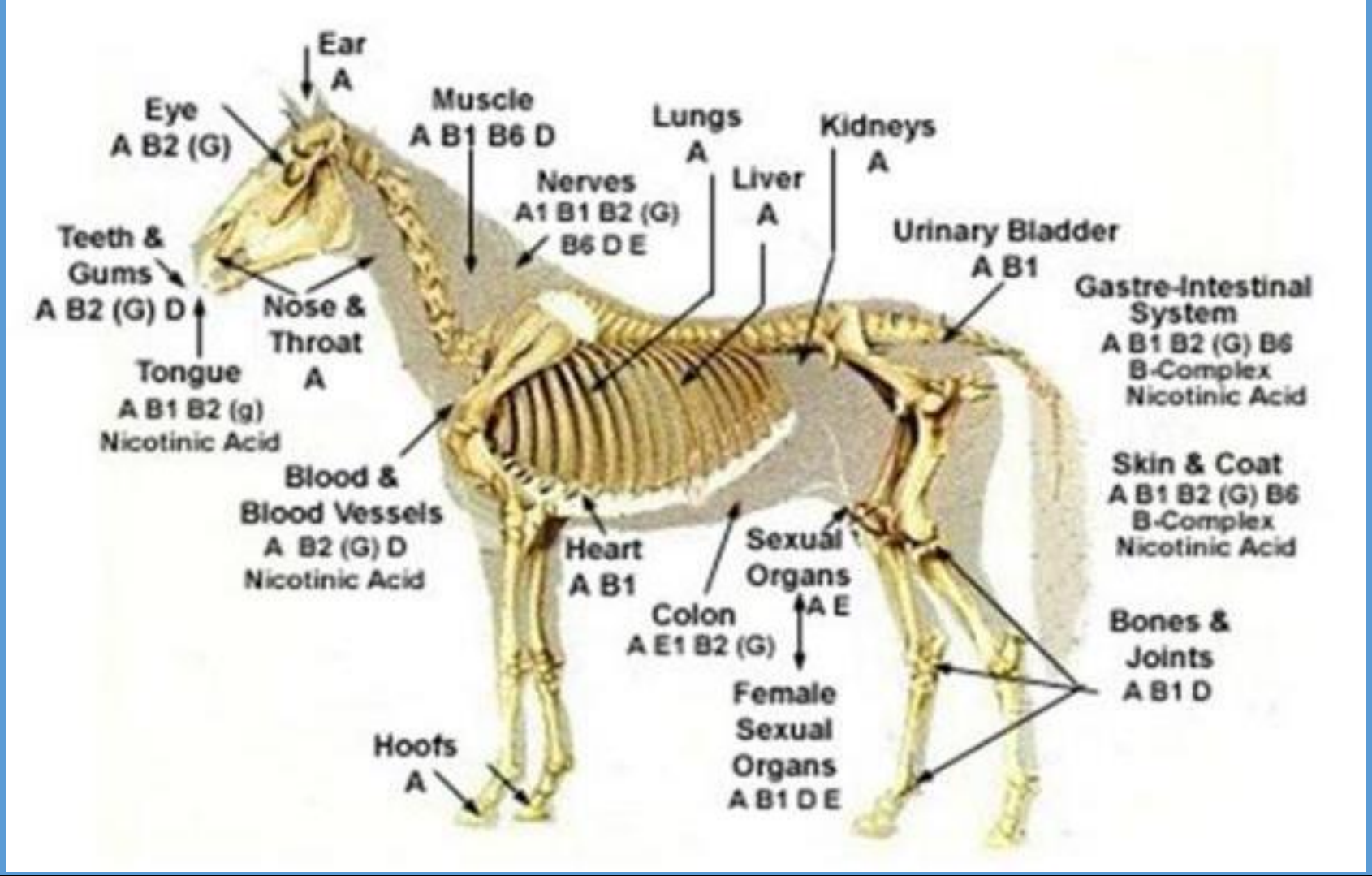

Vitamins

Fat Soluble Vitamins high in fresh forage

Vitamin B & K synthesised by hindgut deficiencies may occur with low fibre pasture.

Vitamin D – need the sun– its good to take the cover off on sunny days

Feeding should be tailored to requirements

No work = No carb supplements, just high fibre and minerals

Working out every day = carbs + protein + minerals + fibre

How much work is your horse doing?

Horse Care and Management

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Aspects of Horse Care:

- Feeding
- Hoof Care
- Teeth Care
- Pasture Management
- Proper Handling
- Common health problems

Proper Feeding of Horses

- what should be done!

- Horses are grazers – ideally they should have free choice roughages all the time!
- However, highly managed horses usually do not have this opportunity!
- Stall kept horses should be fed AT LEAST twice a day.
- They need both good quality hay and grain an free access to water.
- Horses can drink up to 12 gallons of water a day!

How much to feed?

- Stall kept horses should be fed about 2-2.5% of their body weight in hay a day!
- The amount of grain depends on the horse's amount of work and body scoring.
- Amount of work:
  - Maintenance
  - Light (some riding)
  - Moderate (showing and daily riding)
  - Heavy (racing)

Hoof Care

- A person who shoes and cares for a horse's feet
- Horses must have their feet trimmed and/or re-shod every 6-8 weeks.
- Reasons for shoes:
  - Protection
  - Traction
  - Prevention

Tooth Care

- Horse’s teeth are not like ours, their teeth are constantly growing and will sometime grow sharp points that need to be removed. .
- Horses need their teeth **floated** every year.
- Teeth Floating is done by a veterinarian or a horse dentist.

Teeth Floating

- In this process, an electric file is used to remove the sharp points.
- If horse's do not receive proper dental care, it can lead to malnutrition problems.

Pasture Management

- Horses that are kept on pasture need management too.
- **There should be NO more than ONE horse per ACRE of land**!
- All horses, especially pasture horses need to be de-wormed!

Equine Pasture Management

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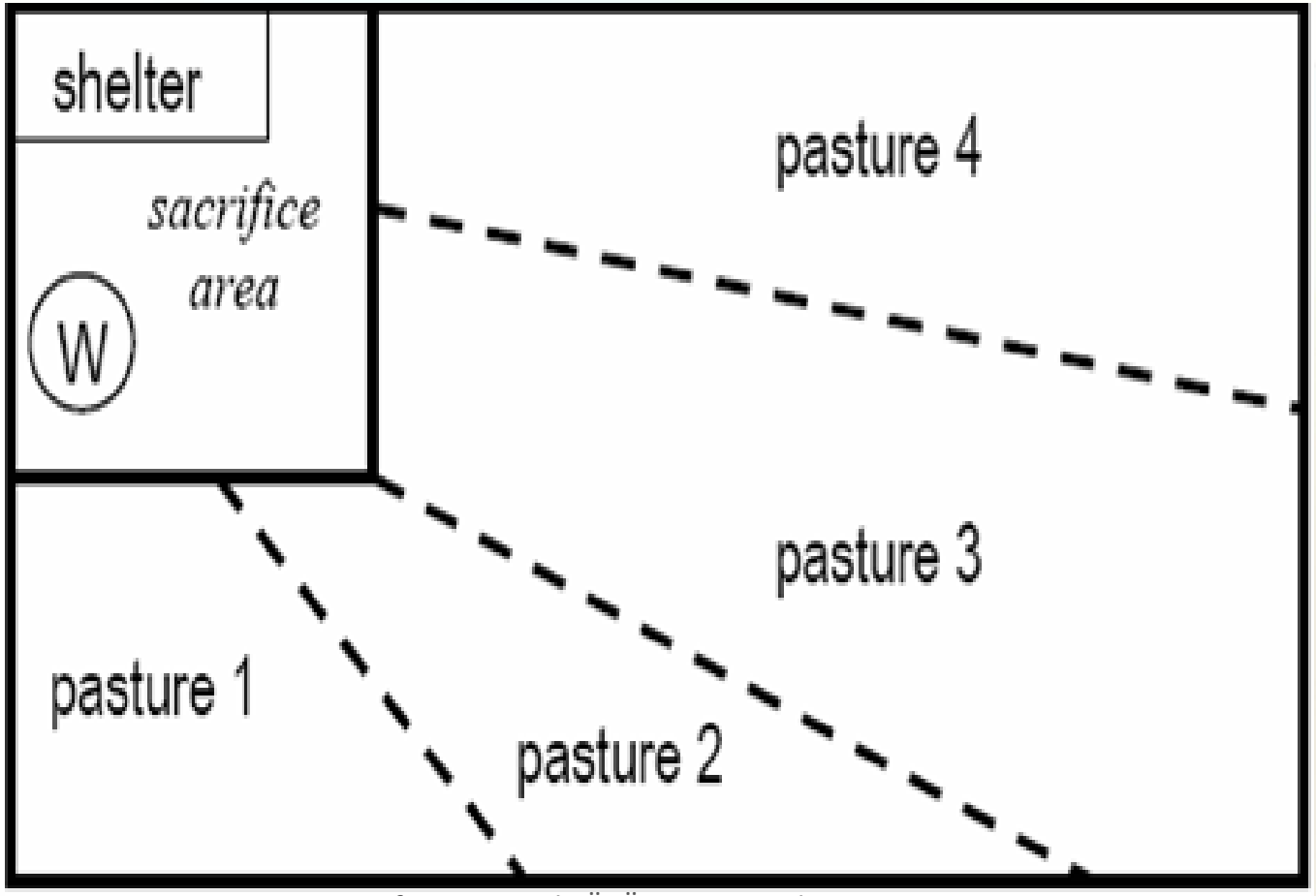
Stocking Rates

- Two acres of well fertilized pasture is needed per mature horse.
- Five acres will be needed if pasture is not fertilized.

Healthy Pastures

- Fertilizer
- Lime
- Renovation so the sod does not get root bound.
- Adequate moisture

Rotational Grazing



Grazing Management

- Avoid grazing until plants have reached an average height of 6 to 8 inches.
- Remove horses and rest pastures when plants have been grazed down to 3 to 4 inches.

Rotational Grazing

- Dividing pasture into cells
- Allow access to one cell at a time.
- When forage is grazed down to 3-4 inches, horses can be rotated into the next cell.
- Previously grazed cells can be allowed to rest and recover.

Over Grazing

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Why Rotate?

- Eliminates selective grazing.
- Rest periods allows grass to recover allowing plants to be more competitive with weeds.
- Amount and quality of the forage growing in pasture increases.
- A greater number of horses can be supported by the same acreage.

Irrigating Pasture

- Irrigation will drastically increase re-growth and yield.

Pasture Recommendations

- Low N option for grazed pastures only
- 50lb/A to 80lbs/A of Nitrogen
- Do soil analysis to determine if Phosphorus and Potassium are needed.
- Best to apply in early spring February-March to get optimum spring growth.

Fertilizing Pastures

- 20-5-10 What does this mean?
- N- 20% nitrogen .20x 300lbs/acre= 60lbs per acre of N
- P- 5% phosphorus .05x300lbs/acre= 15lbs per acre of P
- K-10% potassium .10 x 300 lbs/acre= 30lbs per acre of K
- Lime or Dolomite

Raising pH of Soil

- You want a pH of 5.5 to 6
- 1 ton will increase pH by 1 degree
- If you have a pH of 4 you would want to apply 1.5 tons of dolomite per acre to get a 5.5 pH
- It may take 6 to 12 months to change soil pH.

Planting New Pastures

- Get UF soil analysis
- Apply lime if needed
- Disk ground and get rid of all grass and weeds let ground sit and repeat disking.
- Broadcast seed and fertilizer and cover ½ inch.

Land Preparation

- Disk pasture to 100% disturbance to get rid of weeds and grass

- Seed bed must be free of weeds and grass that will compete with new seed

New Pasture

- Apply 100lb of Nitrogen
- At planting apply 30lb Nitrogen and all of Phosphorus and ½ of Potassium.
- 30 to 50 days later apply remaining 70lbs of Nitrogen and other ½ of Potassium.
- Do not plant seed until rainy season starts.

Best Management Practices

- Written set of plans for farm that address how you manage water and nutrient loading.
- Do not have animals feeding or lounging around water bodies.
- Plan for manure management.

Five major factors that regulate nutrient Requirements

1. Maintenance refers to the nutrient intake required to maintain a constant body weight during normal activities of a non-working horse.
   - Generally, digestible protein and energy requirement for maintenance increase as the horse's weight increases.
   - However, horses larger than 1,300 pounds require less energy for maintenance because they are usually less active.

Five major factors that regulate nutrient Requirements

2. The growth of the horse has a major impact on the nutrient requirement.
   - Protein and energy intakes are the major nutrient factor influencing the growth of young horses.
   - A young horse needs more protein and energy for their active growth and restricted intake of protein and energy will restrict their growth rate.

Five major factors that regulate nutrient Requirements

3. Reproduction factors that regulate the nutrient requirements of a horse include breeding and gestation.
    a) At breeding, nutrient requirements vary.
        1) Mares gaining weight at the same time of breeding are twice as likely to conceive as thin mares maintaining weight; hence, the energy intake may need to be 10-15% above normal
        2) Protein requirements at breeding time are similar to the protein requirement for maintenance.

Five major factors that regulate nutrient Requirements

b. During gestation energy and protein requirements increase dramatically during the last three months of pregnancy.

60-65% of fetal development occurs in the last trimester.

Five major factors that regulate nutrient Requirements

4. Lactation is another major factor that affects nutrient requirements. The level of milk production depends on the energy and protein intake.
5. Working horses require more energy and protein than required for maintenance.
    a. The amount of increased energy and protein intake varies with work conditions.
    b. Increasing the maintenance requirement for energy by 10% for each hour of field work is a reasonable guide.

Other factors affecting nutrient requirements

1. Individuality of the horse (Body composition, metabolism, temperament, ect.)
2. Environmental factors (temperature, humidity, parasite control, ect.)
3. Weight and ability of the rider.

1. Forage (roughage), concentrates and supplements are the three major feed categories fed to equine.
2. Most equine receive their daily ration as forage and concentrates.

Forage

1. Forage is high in fiber, but relatively low in energy.
2. Adequate forage in the ration may be helpful for several reasons. Forage may:
    a. Decrease the risk of colic and laminitis,
    b. Help keep calcium levels higher than phosphorus,
    c. Discourage vices such as wood chewing because forage occupies the equine for longer periods of time than grain.
3. The most common forages used for equine include hay and pasture.

Hay is the most common form of forage given to the horse kept in confinement

1. Legumes and grass plants are common hay ingredients and a legume/grass mixture is preferred for equine in lactation, late pregnancy and during growth.

Hay is the most common form of forage given to the horse kept in confinement

a. Most important consideration once a high quality has had been harvested is that the hay be free of dust and mold which can harm an equine.
   1) Moldy hay most often occurs when hay is baled at too high moisture levels (20% or more), with out a preservative added.
   2) First cut hay also often leads to moldy hay.

Hay is the most common form of forage given to the horse kept in confinement

b. Legume hay is higher in protein, energy, calcium, magnesium, and Vitamin A than grass hay.
c. Rule of Thumb: Feed 1.5 or 1.75% of the body weight as forage. Mature, idle equine may need twice as much hay per day if not fed grain with it.

Hay is the most common form of forage given to the horse kept in confinement

2. Some types of hay:
   a. Timothy hay- very popular for horses, but must be shipped in and adds extra cost.
   b. Oat hay- an excellent feed but may be low in protein, unless harvested at the soft dough stage.
   c. Alfalfa hay- is one of the finest hay for horses because of high palatability and nutritious content.

Hay is the most common form of forage given to the horse kept in confinement

d. Bermuda grass hay is made form coastal Bermuda grass.

e. Legumes (clover) are mixed with cool seasoned grasses to improve hay quality, but one never mixes clover with Bermuda (warm season grasses).

f. **NEVER feed sudangrass and sorghum- sudangrass hybrids to equine:** they cause muscle weakness, urinary problems, and may cause death if cut or grazed after a drought or frost. Kentucky 31 fescue can also cause serious health problems.

Hay is the most common form of forage given to the horse kept in confinement

3. Things to look for when selecting high quality hay:
    a. The MOST important selection criteria for any good quality hay is the stage of maturity or stem to leaf ratio.
        1) Hay should be free of mature seed head or plants in full bloom since their presence indicates that the plant has reached the reproductive stage of growth and is too mature. (hay in the reproductive state has less protein content, is harder to digest, and is palatable.)

Hay is the most common form of forage given to the horse kept in confinement

2) Hay should have a high proportion of leaves relative to stems in order to have increased digestibility and quality.

b. Bright green color- a minimal amount of vitamin a loss from sun bleaching

c. Good clean smell free from moldy or dusty smell.

d. Hay with no foreign matter or weeds that reduce digestibility and palatability to the equine.

Additive

1. Molasses is a feed additive often added to concentrates to increase palatability.
    a. Equine like the flavor.
    b. Molasses reduces dust in the feed and adds energy.
    c. Molasses should be added at the rate of 3-10%. Greater amounts have a laxative affect.

Supplements

- Are used to increase the nutritional value of a ration.

1. Supplements may be used to add protein, vitamins, minerals, or a combination of the three.
2. The need for supplements is determined by the quality of feedstuff and the requirements of the individual equine.

Types of Supplements

1. Protein supplements
    a. Equine that need protein are those young growing equine, milking mares, performance equine in high-stress situations, or equine being fed poor quality roughages like late cut grass.

b. Soybean meal is the preferred plant protein supplement for equine because it has 42-50 percent protein, and a better balance of amino acids than other plant protein source supplements.
c. Other protein supplements include linseed meal, cottonseed mean, meat meals, milk protein, alfalfa meal, and commercial protein supplements.

d. Commercial protein supplements are convenient for those who do not wish to formulate their own rations but they can be expensive.
e. Milk protein supplements have the best distribution of amino acids but are only fed to foals because of cost and digestibility.

2. Vitamin supplements.
    a. Vitamin supplementation is most needed from the time equine are newborn foals through the 12 month yearling and anytime equine are fed poor quality forage. However, the commercial feed should contain them in premix.
        1) Vitamin A and D are required for calcium and phosphorus absorption, but when fed in excess over a period of time can cause problems such as fragile or thick bones, flaking skin, calcification of blood vessels, the heart and other soft tissues, etc.

2) Equine synthesize B vitamins, vitamin C, and Vitamin K in their body and do not need them added to their diet unless they are fed poor quality forages or low levels of good quality forages.
3) Equine who have 12 hours access to good quality pasture or those receiving good quality hay (preferably half legumes) probably need no vitamin supplements

3. Mineral supplements
    a. Mineral supplements added to the concentrate mix are often used to balance the mineral content of rations.
        1) Choice of mineral supplements will depend on availability and cost.
        2) Calcium and phosphorus are the most commonly deficient macro minerals.
        3) Copper and zinc are the most commonly deficient trace minerals.
        4) Rations are balanced so there is <u>always 1.5 to 2.5 times more calcium than phosphorus.</u>

b. Calcium may be supplied by ground limestone or oyster shell flour; while monosodium phosphate will supply phosphorus; and, both, calcium and phosphorus are supplied by steamed bone meal and dicalcium phosphate.
    1) Must be mixed with a more palatable feed source.
    2) Trace-mineralized salt mixed with limestone or dicalcium phosphate satisfies the natural craving of equine for salt, while supplying sodium chloride, calcium, and potassium.

c. A trace mineralized salt block should be provided for the equine “free access”.
d. If selenium is added to the trace mineralize salt it is a mineral mix.

Selecting the Right Ration

1. A ration must be balanced.
    a. Balanced rations consist of a single feed or mixture of feeds to supply energy, protein, minerals, and vitamins for work, growth, lactation, pregnancy, and maintenance.

b. Balanced rations meet the equine's nutrient requirement for the day.
c. Amount of nutrients needed depends on the equine's size and production status.

2. A ration must be palatable (taste good and have good digestion qualities) or the equine will not eat it regardless of the nutritional value.

3. All rations should contain minimal energy content per unit weight to fuel various body processes.
    a. Cost per energy unit is a primary concern for feed costs

b. Energy is the first concern when formulating a ration for all equine. Grain is added to the equines ration to supply the necessary energy.
c. Energy sources must be digestible and provide fuel efficiency in the form of carbohydrates and fats.
d. Energy intake above the amount need to fuel the body for maintenance, production, and growth will be deposited as body fat.

Figuring feed consumption

1. Feeding consumption is proportional to a equine's body weight, level of activity, and the equine's health and state of being.
    a. Lactating mares require more nutrients and they need both extra energy and protein.
    b. Mature equine of larger weight require more energy to maintain their bodies than smaller equine.

2. It is cheaper to maintain a moderate to fleshy condition on a pregnant mare than try to increase the body fat content of a thin mare during the breeding season .

3. While growing foals need high-energy rations, the major concern for any growing equine is adequate protein, minerals, and vitamins.
    a. The growing foal needs higher levels of energy and protein than any other elements.
    b. Equine rations are typically limited to the amino acid lysine and used for growth and reproduction.
    c. Growing equine need .6 percent lysine while horses in production need .3-.4 percent lysine in the total ration.

Feeding practices

1. Equine have individualistic eating habits and do not group feed concentrate very well.
    a. Each equine should have its own concentrate mix feeder and feeders should be a minimum of 50 feet apart.
    b. Extra feeders need to be provided for a third equine to have a place to feed when they are displaced form other feeders.

2. Hay can be fed in a number of ways.
    a. Hay fed on the ground may be contaminated with dirt, feces and urine and may be scattered or walked on. Increased levels of dirt consumed with the hay may cause colic.

b. Hay fed on a feeder placed to high may lead to eye irritation from hay particles or foreign materials.
c. Hay allowed accumulating, molding and spoiling in troughs and mangers can cause severe digestive disorders, including colic and death.

3. Equine may from bad eating habits such as eating to fast if they are not fed at regular intervals.
    a. Equine need to eat at the same time every day.
    b. Even with the mature-idle equine, it is preferred to feed them at least twice a day, approximately 12 hours apart.

4. Ration changes should be don’t gradually over a period of 7–10 days.
    a. 25% of the old ration is replaced with the new ration every two days.

b. Equine should be introduced to pasture gradually with a initial turn out of 30 minutes, increased daily up to the preferred grazing time within 10 days.
c. When introducing equine to pasture, feed their normal ration before turning them out.

5. Special feeding problems:
    a. Obesity is a common problem and is caused by overfeeding and a lack of exercise.
    b. Equine in close confinement crave unnatural feedstuff and may chew on wood, eat their hair or dirt.
    c. Equine that graze pastures on light, sandy soils are prone to sand colic.

6. Parasite control is an important part of feeding management.
    a. Internal parasites decrease digestive efficiency and cause digestive problems.
    b. External parasites annoy the equine and cause equine to spend extra energy.

Equine Science

Classes of Feeds

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Classes of Feeds

- Roughages
- Concentrates
- Supplements

Forages for Horses

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Forage

- The foundation of a horse’s feeding program
- Provide grains and protein, mineral & vitamin supplements only when deficient in forage
- The economical approach to feeding

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Forages Suitable for Equines

- Legume
- Grass
- Cereal Grain
- Mixed grass / legume

Roughages

- High in Fiber
- Low in Energy

- Pasture
- Hay
- Forage Crops
- Silage

HAY OR PASTURE

- Foundation for every feeding program.
  - Adequate chewing time
  - Energy
  - Aids in proper transit thorough GI tract
  - Main substrate for bacterial digestion in the cecum
  - Indigestible parts provide scratch factors – prevent wood chewing

What is forage?

- Min. fiber content of 18% & relatively low dietary energy
- Cell walls – cellulose, hemi cellulose, lignin (0% digested)
- Cell contents – protein, soluble carbohydrates, ether extract, ash

Forages

- Grass
  - Bromegrass
  - Orchardgrass
  - Tall Fescue
  - Timothy
- Grain Hay
  - Oat Hay
  - Wheat hay
- Straw

- Legume
  - Alfalfa
  - Birds Foot trefoil
  - Clovers
  - Lespedeza

Hays Nutritive Value & Palatability

- Plant species
- Level of maturity at harvest
- Weed content
- Growing conditions
- Curing & harvesting conditions

Hays Nutritive Value & Palatability

- Soil conditions & fertility
- Moisture content
- Length & method of storage

Hay

- Most common form of roughage
- Many variables affect hay quality
  - Plant Species
  - Rainfall
  - Stage of plant growth
  - Harvesting Procedures

Choosing Grains & Hays

Grains:

- Corn, Oats, Barley, Sorghum, Wheat
- Clean, Plump
- No Fines
- No Dust, Mold or Foreign Objects

Hays:

- Legume or Grass
- Leafy, Green, Small Stems
- No Mold
- Minimal Dust or Foreign Objects

What is Quality Hay?

- High in nutrient content
- Eaten in large amounts
  - Palatable vs. acceptable
- Appearance?

Hay: Quality & Nutrition

Stems

Mature

Good

Factors Affecting Hay Quality

- Stage of maturity
  - Leafiness vs. stem
- Foreign material
  - Weeds
  - Debris
  - Other forages
- Color
- Condition and odor

Green Color “Means”

- Cut at immature stage
- Proper curing
- High in carotene ⇒ Vitamin A

Condition & Odor

- Shake hay flake
  - White cloud = mold spores
  - Brown cloud = dusty hay
- Avoid moldy hay
  - Feed refusal factor
  - colic

Stage of Maturity

- Cut forages early
  - Grasses- prior to seed head
  - Legumes- at 10% bloom
- Nutrient content decreases with maturity

	Grass field cut	
	June 3	June 27
Crude Fiber (CF)	29%	40%
Crude Protein (CP)	15%	5%
Digestible Energy (DE)	65%	50%

Effect of Maturity on Digestibility

- Immature plants
  - Thin cell wall
  - Cell contents- protein, sugar, fat, starch, pectin
  - Low CF
  - High CP; DE
- Mature plants
  - Thick cell wall
  - Thin cell contents
  - High CF
  - Low DE, CP

Nutrient Content of Forages in Horse Diets[1]

	DM (%)	DE (Mcal/lb)	CP (%)	ADF (%)	CF (%)
Orchardgrass					
fresh	23.5	0.24	3.0	7.2	7.5
immature hay	89.1	0.88	11.4	30.1	30.2
mature hay	90.6	0.78	7.6	34.2	33.6
Coastal Bermudagrass					
fresh	30.3	0.33	3.8	11.1	8.6
immature hay	88.4	0.87	10.6	30.0	26.7
mature hay	93.0	0.79	7.3	35.7	30.4

[1] Nutrient Requirements of the Horse (1989). As fed basis.

Forage Protein Content

	Hay	%CP	% DP	%Lysine
Legumes	Red Clover	14.9	8.3	0.64
	Alfalfa	15.0	10.0	0.64
	Lespedeza	13.4	7.5	0.60
	Timothy	9.0	6.0	0.40
Grasses	Orchardgrass	10.1	6.0	0.35
	Bermudagrass	9.5	4.5	0.43
	Fescue	8.4	3.7	0.41

Lysine is the primary essential amino acid for horses.

Forage Energy Content

	Hay	DE Mcal/kg	DE TDN %
Legumes	Red Clover	2.16	49
	Alfalfa	2.16	49
	Lespedeza	2.07	52
	Timothy	1.98	45
Grasses	Orchardgrass	2.07	44
	Bermudagrass	1.94	44
	Fescue	1.81	45

Forage Mineral Content

Ratio	Hay	%Ca	% P	Ca:P
Legumes	Red Clover	14.9	0.25	6:1
	Alfalfa	15.0	0.25	6:1
	Lespedeza	1.04	0.23	4.5:1
	Timothy	0.41	0.19	2.15:1
Grasses	Orchardgrass	0.35	0.31	1.1:1
	Bermudagrass	0.46	0.18	2.5:1
	Fescue	0.36	0.21	1.7:1

Coastal Bermudagrass Hay

- Can be cut 4-5 times per year
- Value can be increased by mixing in legumes

Sudangrass Hay

- Cut in early bloom stages for maximum nutrient quality
- May be toxic if harvested early
  - Prussic Acid
- Similar to Johnsongrass

Alfalfa Hay

- Highly Palatable (acceptability of taste)
- High in Protein (18%-19%)
- Good Source of Vitamins A and B
- Higher Priced
- 5-8 cuttings (not all are clean)

Cubes

Clover Hays

- Nutritious
- Similar to alfalfa
- Difficult to cure
- 14%-16% protein
- Mostly raised for pasture, not hay

Pasture

- Native is most common
- Grasses, legumes, and forbs
- Generally, pasture should be a mixture of 1-2 grasses with 1-2 legumes.
- A mature horse requires a minimum of 2 acres

Concentrates

- Low in fiber and high in energy

- Grains
- Grain by-products

Concentrates

- The concentrate part of the ration contains the grains
  - Higher in energy
  - Lower in fiber
- Most Common
  - Oats
  - Barley
  - Corn

Than Roughages

Oats

- Most Popular grain fed to horses
- High fiber content (13%)
  - More bulk per nutrient content
  - Must eat more to satisfy nutrient content
  - Less likely to founder or colic
- Cleanliness is a must
  - Dust feeds can lead to respiratory problems
- Whole or processed

OAT,

1. Oats are the most popular grain that horsemen feed horses because they are highly palatable and a fibrous grain with less risk of nutritional diseases.
    a. Oats have a higher fiber content than corn or barley which means oats have more bulk per nutrient content.

OAT,

b. The higher bulk of oats makes it more difficult for the horse to over eat and get colic or founder.
c. Horses may eat oats whole or processed, but crimping, rolling, or crushing the kernel increases digestibility.

Barley

- Comparable to oats
  - Lower in fiber
- Weighs more per unit volume than oats

Barley

Oats

Barley is lower in fiber than oats and has greater energy density.

a. Substitute barley for oats if the cost per unit of energy is less.
b. Barley has a harder kernel than oats and should be processed before using as horse feed.
c. Crushed or ground barley can cause colic in horses and needs to be mixed with a more fibrous feedstuff as a preventative measure.

Corn

- Very “energy-dense”
  - Large amounts of carbohydrates
- Excellent for horses that require a lot of energy
  - Working horses
  - Race Horses
- Low in protein
- High weight per unit volume

Corn is the most energy-dense farm grain and is referred to as a “hot feed”

a. Corn has about 2 times the amount of energy as oats.
b. Corn contains large amounts of carbohydrates (starch) and should contain less than 14% moisture to prevent mycotoxin formation and toxicity.
c. Cracked corn increases digestibility but rolled or crushed corn may ferment quickly in the digestive tract leading to colic.

Molasses

- A popular component of mixed concentrates
- Palatable
- Cheap source of energy
- Can reduce the quantity of dust in feed
- 5% of the ration - recommended

Supplements

- Can help correct deficiencies in protein, minerals, and vitamins.
- Increases nutritive value
- 4 common types
  - Protein
  - Vitamin
  - Mineral
  - Combination of all three

Protein

- Higher requirement for horses that are:
  - Growing
  - Lactating
  - In later pregnancy stages
  - Eating poor quality roughage
  - Performance animals (high stress)
- Converted to energy by the horse

Protein

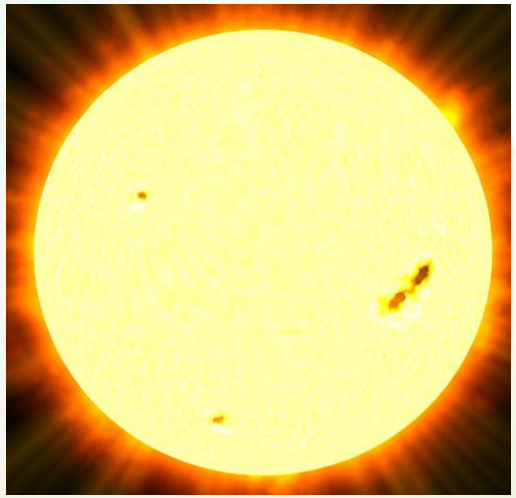
- Examples of protein supplements include:
- Alfalfa
- Linseed
- Soybean (Lysine)
- Cottonseed Meal

Vitamins

- Horses derive no benefits from “extra” vitamins.
- Supplements for Vitamin A:
  - Fish liver oils
  - Liver meal
- Supplements for Vitamin B:
  - Dried brewer’s yeast
  - Dried legumes

Vitamins

- Supplements for Vitamin D:
  - Suncured hay
  - Exposure to sunlight



- Supplements for Vitamin E (usually not necessary):
  - Alfalfa pellets

Minerals

- Frequently needed to balance the mineral content of rations.
- Most common deficient minerals are:
  - Calcium
  - Phosphorus
  - Sodium chloride

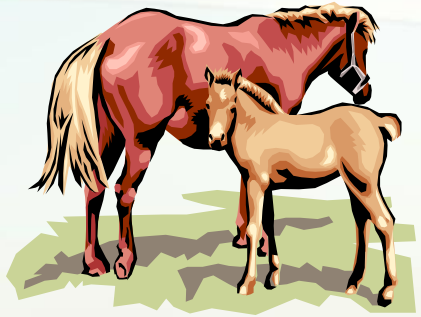
Minerals

- Supplements for Calcium and Phosphorus:
  - Steamed Bone Meal
  - Dicalcium Phosphate

- Supplements for sodium chloride:
  - Salt block

Supplement Energy?

- Concentrates often needed -
  - Late gestation
  - Lactation
  - Growth
  - Work



Energy Sources Comparative Values

Grain	DE (Mcal/lb)	Relative Feeding Value by volume (%)	CP (%)	Crude Fiber (%)	Comments
Oats (regular)	1.3	45	11-12	11	Most palatable & safest. Variable in quality
Oats (heavy)	1.4	50	12.5	11	Also called “racehorse” or “jockey” oats
Groats (hull-less oats)	1.7	95	18	2.1	
Corn (maize)	1.5	100	8-10	2.2	Grain most prone to mold & most commonly overfed

Energy Sources Comparative Values

Grain	DE (Mcal/lb)	Relative Feeding Value by volume (%)	CP (%)	Crude Fiber (%)	Comments
Barley	1.5	85	12	5	Between oats & corn in safety, but less palatable.
Grain sorghum (milo)	1.45	95	11.5	2.5	Should be processed.
Wheat	1.55	110	11-14	1.5-3	Less palatable then corn or oats. Should be processed.
Rye	1.53	100	12	2.2	Feed processed, with 1/3 max. in grain mix.
Fats	3.61		--	--	

Crude Fiber & DE Relation of Commonly Fed Feeds

Feedstuff	DE (Mcal/lb)	CF (%)
Corn	1.5	2
Wheat Mids	1.4	7
Oats	1.3	12
Soybean Hulls	1.1	32
Alfalfa Hay	1.0	20

Relationship of Crude Fiber to Expected DE

If the feed tag indicates CF (%) of	Then, DE (Mcal/lb) of the feed will be ~	But if the feed contains 5% added fat, the DE (Mcal/lb) will be ~
4	1.55	1.65
6	1.45	1.55
8	1.35	1.45
10	1.25	1.35
12	1.15	1.25

Minerals

- Content in the diet will be determined by soil
- Quality of feed and proportion of grain to hay
- Ca and P
  - Continuous loss
  - 70% of the mineral content of the body
  - 99% of the Ca and 80% of the P in bones and teeth
  - 1.1—2.0 parts Ca to 1.0 part P is ideal
  - Quality forages usually provide adequate Ca & P

Minerals

- Salt (NaCl)
  - .5-1.0% added
  - ~ 60 g/d
  - Free choice
  - Either in block form or loose

- Potassium, Magnesium, Sulfur
  - Supplement as a group - use one
    - quantities are additive - toxicities possible
  - Keep in the proper ratios

Trace Minerals

- Look for iron, zinc, copper
- Ratios affect absorption of all
- Toxicities often seen with iron and selenium

Trace Mineralized Salt

- 98% sodium chloride
- Zn – 0.1-0.35%
- Manganese – 0.20-0.28%
- Iron – 0.15-0.35%
- Copper – 0.02-0.04%
- Cobalt – 0.05-0.007%
- Iodine – 0.007%
- TMS containing high levels of Cu (0.25%), Zinc (0.75%) and/or selenium (0.0025%) is available.

Vitamins

Fat soluble:

- stored in body - A, D, E, K
- Toxicity’s can occur if fed in excess

Water soluble:

- must be continuously supplied
- B-complex; niacin, thiamin, riboflavin

Vitamin/ Mineral Combinations

- A, D, E, & K - Stored in fat - potentially toxic
- C, B complex - water soluble
- Blood builders - mostly iron
- Vitamins easily destroyed by heat, copper and iron, dampness, and high oil levels
- Biotin/methionine - sulfur - hoof growth

Feeding Horses

- Feed intake usually expressed as
  - % of Body Weight
  - Lbs feed/100 lbs body weight
  - Free Choice
- Min. 1% BW as forage
- Grains provide 50%-60% more DE than forage
- Vegetable oils & animal fats provide 2.25x more energy then grain
  - No more than 10-15% of total diet

Expected feed consumption %BW

	Forage	Concentrate	Total
Maintenance	1.5-2.0	0-0.5	1.5-2.0
Mares, late gestation	1.0-1.5	0.5-1.0	1.5-2.0
Mares, early lactation	1.0-2.0	1.0-2.0	2.0-3.0
Mares, late lactation	1.0-2.0	0.5-1.5	2.0-2.5
Light work	1.0-2.0	0.5-1.0	1.5-2.5
Moderate work	1.0-2.0	0.75-1.5	1.75-2.5
Intense work	0.75-1.5	1.0-2.0	2.0-3.0
Nursing foal, 3 mo	0.5-1.0	1.0-2.0	2.5-3.5
Weanling foal, 6 mo	0.5-1.0	1.5-3.0	2.0-3.5
Yearling foal, 12 mo	1.0-1.5	1.0-2.0	2.0-3.0
Long yearling, 18 mo	1.0-1.5	1.0-1.5	2.0-2.5
Two year old	1.0-1.5	1.0-1.5	1.75-2.5

Remember…

- Make educated decisions
- Feed by weight not by volume
- All feed should be clean of mold, dust, etc.
- Feed at regular intervals
  - ~12 hours
- Make gradual changes in feeding program
  - “Safer” to increase hay then grain

Nutrition

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University Faculty of Veterinary Medicine

2001…D. Karen Hansen, PhD
2007…Stephen R. Schafer, EdD

Feeding Management

- Feed at the same time each day
- Feed horses on an individual basis
- Feed horses at least twice daily or if confined, allow access to hay throughout the day
- Horses need some amount of fiber in their diet daily (minimum of 1% of body weight in hay)
- Feed horses grain only if needed - growing, hard working or lactating horses
- Change diets gradually: over at least 4-5 days

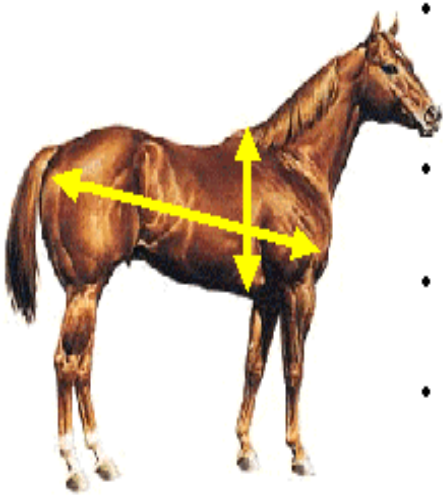
Practical Feed Management

- Determine the activity- Make A Plan!
- Determine the horse's Condition Score
- Determine the horse's fitness level
- Determine the increase in feed needed for the activity level
- Increase workload and feed gradually
- It takes about 6 wks or more to go from an unfit state to a fit and functional state

Body Condition Score

- Body Condition Score is based upon how much fat the horse is carrying
- The scoring system uses a scale of 1 to 9
- Useful to group horses for feeding management

Equine Weight Estimates



- Measure horse from point of chest to point of croup in inches = length
- Measure horse's heartgirth or circumference in inches
- (heartgirth x heartgirth x length /300) + 50 = weight
- [((70" x 70")65")/300)+50] = 1,111 lbs. (+/- 3%)

Feeds & Nutrition - **Ensminger & Olentine**

members.aol.com/CRTrust/PONYSEX.html

Henneke Body Condition Score

- Measures amount of body fat
- Determines balance between energy intake & expenditure
- Developed in 1983 by Dr. Don Henneke
- Simpler, repeatable, consistent method
- Comparison between animals

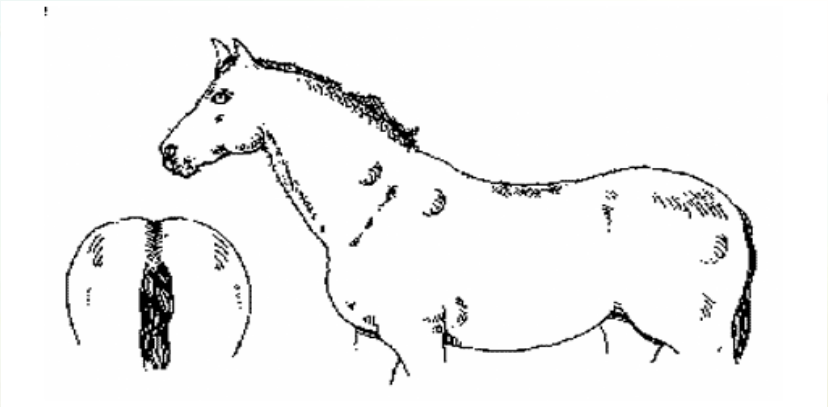
Score 1 - Poor

Score 5 – Moderate

- Back is level
- Ribs cannot be visually distinguished, but can be easily felt
- Fat around tailhead beginning to feel spongy
- Withers appear rounded
- Shoulders & neck blend smoothly into body

Score 8 – Extremely Fat

- Obvious crease down back
- Patchy fat appearing over ribs
- Bulging fat around tailhead, around withers, behind shoulders, and along neck
- Fat along inner buttocks
- Flank filled and flush



Energy Requirements

- **Maintenance:**

  Rest, No Work/Use, etc.

- **Light Work:**

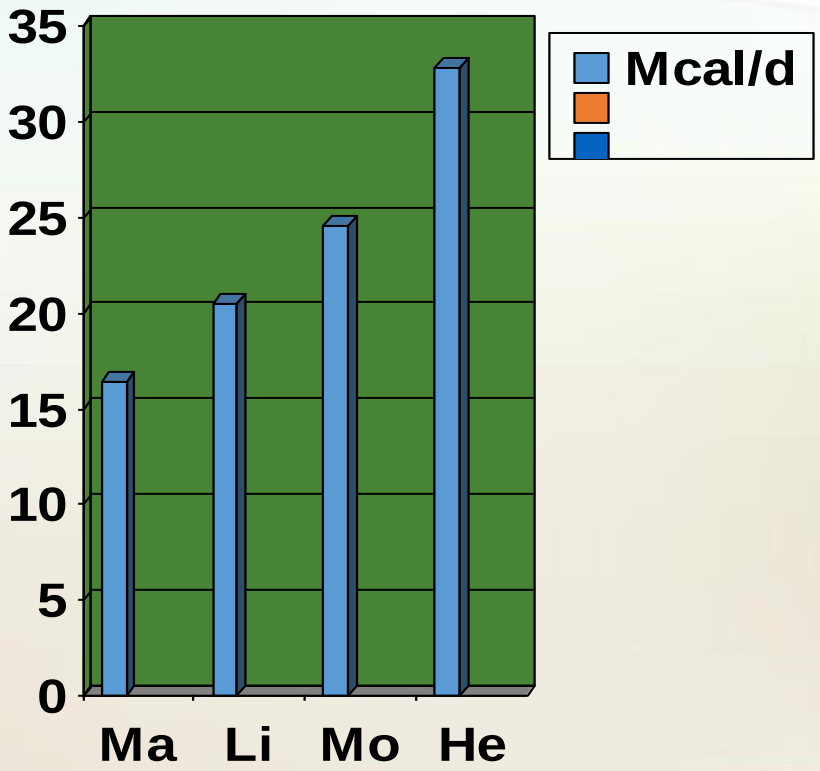
  Pleasure, Trail, etc.

- **Moderate Work:**

  Longer and/or Harder Rides, Light Ranch Work, etc.

- **Heavy (Intense) Work:**

  Heavy Ranch Work, Racing, Polo, etc.



Energy Providing Nutrients

- Carbohydrates & Fats
- Carbohydrates are typically the most common source of energy for horses
- Energy is the fuel for all body functions
- Grains are considered a high energy source
- There has been some work with feeding additional fat to horses (up to 12% of ration)

Nutrients

- Water
- Protein
- Vitamins
- Minerals
- Energy Yielding Nutrients
  - Carbohydrates
  - Fats

Water

- The most important nutrient
- Important for nutrient digestion, nutrient absorption, and temperature regulation
- Obtained by drinking and from feeds
- Consumption varies according to need
  - Maintenance: 4-10 gallons/day
  - Heavy Work: 20 gallons/day

Protein

- Protein is commonly measured in the diet in the form of Crude Protein (CP)
- Protein commonly makes up 7-20% of the horse's diet
- Protein is required in a greater amount for young and growing animals
- Provides amino acids for building and maintenance of muscle, bone, enzymes, and hormones

Protein

- Needed for: muscle & bone growth, milk production, fetal growth, normal metabolism
- Requirements can be met with good quality hay or pasture forage
- Low requirements for maintenance
- ***Quality*** = amino acid balance
  - Very important for young horses
  - Lysine, methionine, tryptophan most limiting for growth & milk production

Protein

- Amino acids in protein are required in the diet (essential) or can be made from other amino acids supplied by protein (non-essential)
- Lysine is considered to be the first limiting amino acid- young growing animals need adequate lysine
- High concentration of protein in legumes (alfalfa, soybeans) and seeds (especially oil seeds)
- Protein is expensive - therefore we balance rations to not overfeed protein

Vitamins: General Principles

- Vitamins are generally needed in small amounts
- Vitamins are important factors and/or co-factors for chemical reactions in the body
- Horses receive vitamins from high-quality hays and grains….however, hays stored over 1 year usually lose a great deal of vitamin activity
- Vitamins are fat -soluble (A,D,E,K) or water-soluble (B vitamins and C)
- Fat soluble vitamins can be stored in fat or liver; water soluble are not stored in the body

Vitamins: Specific Aspects

- Vitamin A (essential for vision): usually present in high-quality leafy forages or through grazing; can be stored
- Vitamin D (essential for Ca absorption & bone growth): can be obtained through sunlight or UV light exposure and feeds
- Vitamin E (important for its antioxidant properties - to keep cell membranes healthy): found in high quality hays and grains

Vitamins: Specific Aspects

- Vitamin K (important for blood clotting): found in high quality forages and intestinal bacteria, can be synthesize
- B vitamins: usually supplied in adequate amounts in good quality feeds; B 12 is synthesized by bacteria in cecum and colon
- THIAMIN: the only B-vitamin that may need supplementation
- Vitamin C: not considered dietary essential because it can be made by the horse

Minerals

- Required in very small amounts (ppm)
- Inorganic elements required by the body for chemical reactions and structure/foundation (bones and teeth)
- Macrominerals (required in greater amounts) - Ca, P, Mg, Na, Cl, S, K
- Microminerals (required in smaller amounts) - Cu, Zn, I, Fe, Mn, Se

Minerals

- Calcium & Phosphorus - important in bones and teeth plus metabolic functions (i.e. muscle contraction)
- We balance rations for Ca and P
- Ca is present in moderate/high levels in hays/forages
- P is present in moderate levels in grains
- The absolute amount as well as the ratio of Ca:P is important in horse diets
- Normal dietary requirements of Ca:P is about 1.43:1
- The Ca:P ratio should never be less than 1:1; or over 3:1 in young horses, 6:1 in mature horses

Minerals

- Sodium (Na) and Chloride "salt" (important in osmotic balance): not enough present in normal feeds (supplementation); usually add .5% - 1% to horses diet or free-choice
- Magnesium (important for bones and metabolism): found in normal feedstuffs
- Sulfur - usually not a problem; horses tend to get enough S from S-containing amino acids
- Potassium (important in intracellular action): potassium is relatively high in forages

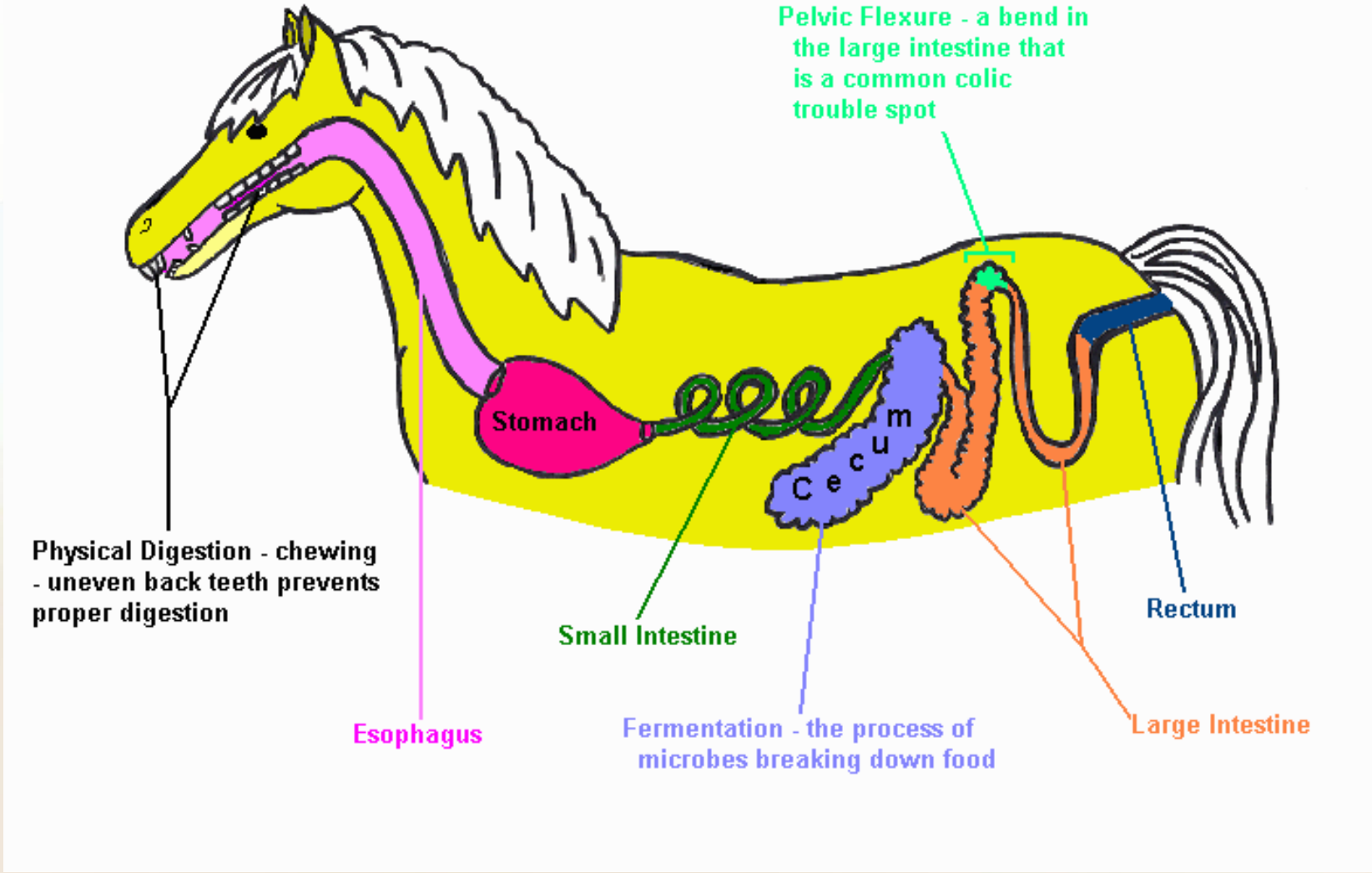
Minerals

- Cu, Zn (important for connective tissue and skin integrity): need to watch levels in growing horses; too much Zn can cause Cu deficiency
- I (essential for T3 and T4 that control basal metabolism): usually adequate in feed with iodized salt - can be over-fed!
- Fe (component of hemoglobin): usually adequate in feedstuffs
- Se (detoxification of substances that are toxic to cell membranes): can be toxic in soils in some areas, can also be deficient
    - Req: 0.1 mg/kg of diet
    - Toxic: 2.0 mg/kg of diet!

Horse's Digestive System

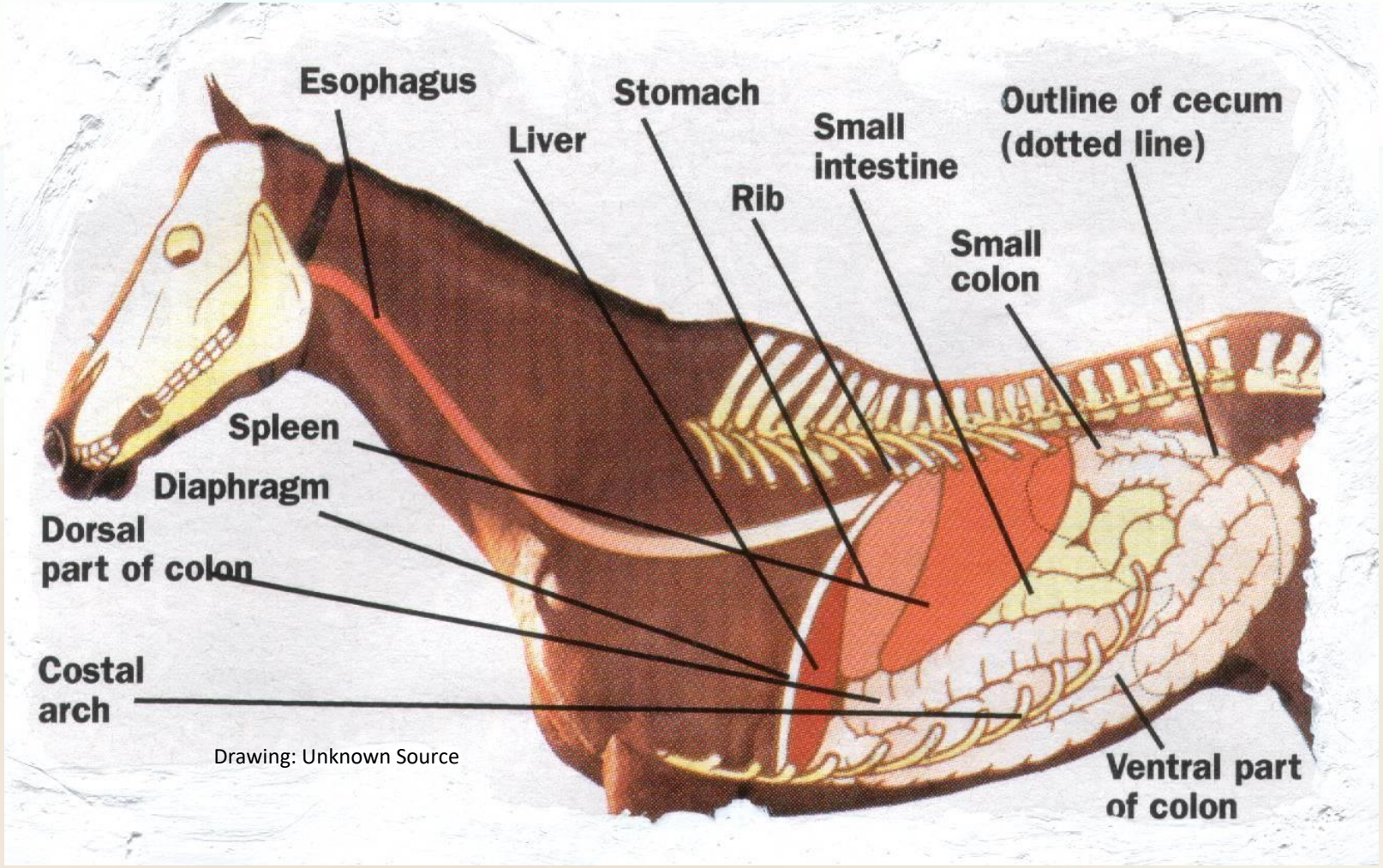
- One way system - horse can't vomit
- Small stomach
- Small intestine - fast rate of passage
- Large Intestine - bacteria and protozoa
  - Cecum (pouch at beginning of large intestine)
  - Colon (part of large intestine, cecum to rectum)

Digestive System---Drawing



http://www.landmark.coop/images/cottg/HORSEDIG.GIF

Digestive System---Illustration



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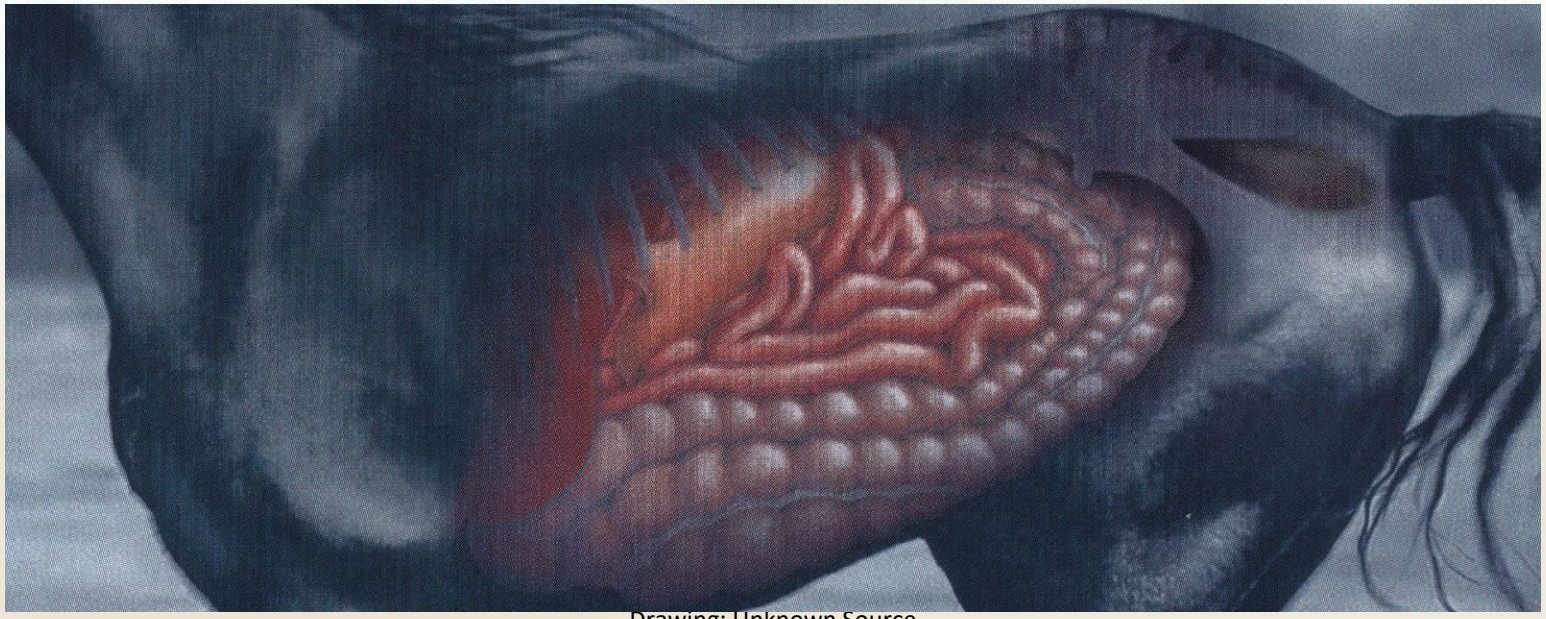
Digestive System---Schematic



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Small Intestine Digestion

- Carbohydrates: soluble (sugars, starches)
- Fats
- Protein
- Fat soluble Vitamins
- Minerals

Large Intestine Digestion

- Water: re-absorbed in cecum and colon
- Carbohydrates: (hemicellulose) - colon
- Carbohydrates: (cellulose) - cecum

Digestion

- Water soluble vitamins - all along tract; some only in hindgut
- Upper tract: liquid due to saliva and digestive fluids and enzymes

- Lower tract: more solid due to water re-absorption

Suckling Foals and Weanlings

- Suckling foals 3 to 4 months old need usually need no supplementation
- After 4 months start foals on type of concentrate they will be fed as weanling
- Foals should consume 6 to 8 pounds of concentrate per day and 1 pound of hay per 100 body weight at weaning time

Yearlings and Two Year Olds

- .5 to 1 pound of grain per 100 pounds of body weight
- 1 to 1.5 pounds of hay per 100 pounds of body weight
- Feed for desired condition and workload

Mature Horse

- Idle---1.5 to 1.75 pounds of hay per 100 pounds of body weight, requires 0.5 to 0.75 pounds of high protein supplement

- High Work Load---0.5 to 1.75 pounds of grain and 1 to 1.5 pounds of hay per 100 pounds of body weight

Pregnant and Lactating Mares

- First Half---1.5 to 2 pounds of hay per 100 pounds of body weight and 0.5 to 0.75 pounds of high protein supplement
- Last Half---0.5 to 1 pound of grain and 1 to 1.5 pounds of hay per 100 pounds of body weight
- Lactating---1 to 1.5 pounds of grain and 1 to 1.5 pounds of hay per 100 pounds of body weight.

Nutrition Requirements

TABLE 11–1C. Daily Nutrient Requirements of Horses (500-kg mature weight)

Animal	Weight (kg)	Daily Gain (kg)	DE (Mcal)	Crude Protein (g)	Lysine (g)	Calcium (g)	Phos-phorous (g)	Magne-sium (g)	Potas-sium (g)	Vitamin A (10^3 IU)
Mature horses										
Maintenance	500		16.4	656	23	20	14	7.5	25.0	15
Stallions (breeding season)	500		20.5	820	29	25	18	9.4	31.2	22
Pregnant mares										
9 months	500		18.2	801	28	35	26	8.7	29.1	30
10 months			18.5	815	29	35	27	8.9	29.7	30
11 months			19.7	866	30	37	28	9.4	31.5	30
Lactating mares										
Foaling to 3 months	500		28.3	1,427	50	56	36	10.9	46.0	30
3 months to weaning	500		24.3	1,048	37	36	22	8.6	33.0	30
Working horses										
Light work[a]	500		20.5	820	29	25	18	9.4	31.2	22
Moderate work[b]	500		24.6	984	34	30	21	11.3	37.4	22
Intense work[c]	500		32.8	1,312	46	40	29	15.1	49.9	22
Growing horses										
Weanling, 4 months	175	0.85	14.4	720	30	34	19	3.7	11.3	8
Weanling, 6 months										
Moderate growth	215	0.65	15.0	750	32	29	16	4.0	12.7	10
Rapid growth	215	0.85	17.2	860	36	36	20	4.3	13.3	10
Yearling, 12 months										
Moderate growth	325	0.50	18.9	851	36	29	16	5.5	17.8	15
Rapid growth	325	0.65	21.3	956	40	34	19	5.7	18.2	15
Long yearling, 18 months										
Not in training	400	0.35	19.8	893	38	27	15	6.4	21.1	18
In training	400	0.35	26.5	1,195	50	36	20	8.6	28.2	18
Two year old, 24 months										
Not in training	450	0.20	18.8	800	32	24	13	7.0	23.1	20
In training	450	0.20	26.3	1,117	45	34	19	9.8	32.2	20

NOTE: Mares should gain weight during late gestation to compensate for tissue deposition. However, nutrient requirements are based on maintenance body weight.

[a]Examples are horses used in Western and English pleasure, bridle path hack, equation, etc.

[b]Examples are horses used in ranch work, roping, cutting, barrel racing, jumping, etc.

[c]Examples are horses in race training, polo, etc.

Nutrition Content

TABLE 2. NUTRIENT CONTENT OF SELECTED FEEDSTUFFS (AS-FED BASIS)

FEED	DIGESTIBLE ENERGY (MCAL/LB)	CRUDE PROTEIN %	CALCIUM %	PHOSPHORUS %
Grains				
Barley	1.5	11	.05	.33
Corn	1.6	9	.04	.53
Oats, heavy	1.3	12	.06	.30
Sorghum grain	1.4	11	.03	.30
Hays				
Alfalfa, early				
bloom	1.0	18	1.28	.19
mid-bloom	.9	17	1.24	.22
mature	.8	15	1.08	.22
Meadow hay				
Inter-mountain	.7	8	.58	.17
Prairie hay	.7	6	.32	.12
Protein Feeds				
Soybean meal	1.5	44	.35	.63
Cottonseed meal	1.3	41	.17	1.11
Linseed meal	1.3	35	.39	.80

NRC (1989)

Ration Calculation

- First figure roughage requirement (1-2% of body weight) ex. 0.0175 x 1100 lbs. = 19.25 lbs.
- Then figure D.E., C.P., Ca. and P provided by this amount of hay
- Next figure how much concentrate to feed based on D.E. deficit remaining
- Double check- does it make sense?

Example of Ration Calculation

Animal Description Mature horse at moderate work Body Weight 1100 lb

	(a) Digestible energy Mcal	(b) Crude Protein lb	(c) Calcium g	(d) Phos. g
A. *Daily Requirements* (based on horse activity)				
1. Moderate work	24.6	2.17	.30	.21
2.				
3. Total Daily Requirements				
B. *Forage Ration* (between 1% to 2% of body weight)				
1. 19.25 lb of Orchardgrass hay	14.8	2.0	32.0	20.0
2. ____ lb of				
3. Total Nutrients from Forage	14.8	2.0	32.0	20.0
C. Remaining, to be supplied from concentrate ("Total Daily Requirements" less "Total Nutrients from Forage"). (A.3. − B.3.)	9.8	0.17	0	1.0

D. Amount of Concentrate Required. Assume a typical concentrate will contain approximately 1.35 Mcal/lb DE (air-dry basis) (C.a. ÷ 1.35 = lb)

9.8 Mcal DE needed ÷ 1.35 Mcal/lb DE = 7.26 lb

E. Percent Crude Protein Needed in Concentrate Mix. Divide CP to be supplied from concentrate (C.b.) by concentrate required (D.) times 100 = %CP in concentrate mix. (C.b. ÷ D. X 100 = %CP)

____ lb CP needed ÷ ____ lb mix X 100 = ____ % CP

F. *Concentrate*				
1. 7.26 lb of Oat grain	9.8	0.8	2.6	11.2
2. ____ lb of				
3. ____ lb of				
4. Total Nutrients from Conc.	9.8	0.8	2.6	11.2
G. Total Ration Nutrients (B.3. + F.4.)	24.6	2.8	34.6	31.2

Horse Nutrition: Summary

- Feed according to body condition
- Feed according to work preformed
- Feed twice a day
- Need a minimum of 1% of weight in hay
- Water should always be clear and cool preferably given before feeding
- Feed changes should be gradual

Diseases and Parasites of Horses

Animal Science I

Unit 33

Prof.Dr. M.Kemal KÜÇÜKERSAN Anakara
University Faculty of Veterinary Medicine

Objectives

- Identify common diseases and parasites of horses
- Describe prevention measures for diseases and parasites of horses

Proper Feeding and Management

- Dusty or moldy feed should never be used
  - The mycotoxin *fumonisin* is sometimes found in moldy corn. It is toxic to animals and may cause brain and liver disorders in horses.
- Water consumption after hard work should be carefully controlled

Cleanliness and Sanitation

- Prevent the growth of disease organisms and parasites
- Helps break the life cycle of many parasites
- Do not keep horses in barns that are warm and humid

Immunization and Parasite Control

- Vaccinate
- De-worm

Preventing Spread of Disease

- Isolate sick animals
- Keep water and feed containers separate as well
- Call a vet

Vital Signs

- Temp: 99-100.8
  - Average is 100.5
  - Temp. is usually higher in the morning than the afternoon and younger animals will show a wider range of temps.
- Pulse Rate- 32-44 BPM
- Respiration- 8-16 breaths per minute

Diseases and Disorders

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Common Health Problems

- **Colic** – Horse's, unlike humans, cannot throw-up. Colic is the term used for a horse having a belly ache .
  - Signs: Rolling, biting and belly, thrashing around the stall
  - What to do: Call a vet, Keep the horse walking (to try to keep their bowels moving so the problem can pass)

Common Health Problems

- **Lameness** – many causes!
  - Signs: horse not wanting to walk
  - What to do: call a vet or equine professional to look for the cause
  - A non lame horse is termed **sound**
- **Thrush** – bacterial infection in the sole of the hoof around the frog.
  - Signs: Bad smell! Frog peeling off
  - What to do: apply antifungal medicine

Review

- I am going to give you a “class” of four horses. Please tell me the following about each one:
  - Color
  - Leg and face markings
  - Body Conditioning score

Anhydrosis

- Condition in which horses do not sweat normally
- Management practices
  - Riding and working the horse only when cool
  - Keeping the horse out of sun
  - Using fans and air conditioning
  - Feeding a higher fat diet
- One treatment that has shown success is using a thyroid medication

Anthrax

- Symptoms
  - High fever, blood in the feces, rapid breathing, swelling on the body, especially the neck, depression in later stages
  - May bleed from all body openings
  - Death rate is high
- Controls
  - Isolate sick horses
  - Vaccinate healthy ones
  - Quarantine the area, change pastures, practice strict sanitation
- Prevented by Vaccination

Anthrax

Azoturia (Monday-Morning Sickness)

- Develops when a horse is put to work following a period of idleness
- Symptoms
  - Stiffness, sweats, dark colored urine
  - Muscles become swollen, tense and paralyzed
- Prevention
  - decrease the amount of grain fed while the horse is idle
  - Exercise when idle
  - Start back to work slowly
- If symptoms appear
  - Stop work and movement
  - Use blankets to keep the horse warm and dry
  - Call the vet.

Bruises and Swelling

- Apply cold compresses until the bleeding and swelling stop
- Apply heat and liniments to the affected area

Colic

- Encompasses a wide range of conditions that affect the digestive tract
- Usually caused by some type of abdominal obstruction that blocks the intestine, resulting in pain
  - Pain is caused when the intestine is distended by an accumulation of gas, fluid or feed
- Must be treated immediately

Colic

- Causes
  - Parasites, (large strongyles (blood worms)
  - Nutritional factors
  - Teeth or mouth problems
  - drinking excessive quantities of cold water before being cooled out after heavy exercise
  - Diseases that cause high fever and reduce intake of feed and water
  - Feeding excessive amounts of grain
  - Twisting the intestine

Colic

- Symptoms
  - Sever abdominal pain
  - Uneasiness or restlessness
  - Looking at the flank region
  - Getting up and down
  - Kicking at the belly
  - Sweating
  - Shifting weight
- As the problem continues the horse may lie down and roll, have an increased pulse and respiration rate, congested gums, strain, sweat, and bloat

Colic

- Prevented by good management practices
- If colic develops call the vet, as it can be treated satisfactorily if treating is started quickly

Colic Surgery

Distemper (Strangles)

- Caused by a bacterium
- Spread quickly by contaminated feed, water troughs, tack or direct contact
- Young horses are more likely to get it than old
- Symptoms
  - High fever, loss of appetite, depression, puslike discharge from the nose, lymph nodes in the lower jaw and throat swell
- Treat with antibiotics and isolate newly arrived animals for 2-4 weeks
- Vaccinate if the farm has a history of distemper.

Distemper (Strangles)

Encephalomyelitis (Sleeping Sickness)

- Affects the brain
- Common forms are known as Eastern and Western
- Carried by mosquitoes
- Symptoms
  - High fever, depression, lack of coordination, lack of appetite, drowsiness, drooping ears, circling
  - May die or recover
    - Death rate is as high as 90% from the Eastern and Venezuelan types
    - 20-30% for the Western type
- Prevented with vaccination and controlling mosquitoes
- No effective treatment

Equine Abortion

- May be caused by bacteria, viruses or fungi
- Other causes: hormone deficiencies, carrying twins, genetic defects or other misc. factors
- May occur at various times during pregnancy depending on the cause
- Virus abortions may be prevented by vaccination
- Bacterial abortions are best prevented by sanitation at breeding time
- Isolate horses that have aborted
- Bedding and aborted fetus should be burned or buried
- Area should be disinfected
- No vaccination for fungi-caused abortions

Equine Infectious Anemia (Swamp Fever)

- Caused by a virus
- Carried from horse to horse by bloodsucking insects
- Symptoms
  - Fever, depression, weight loss, weakness, swelling in the legs
  - Death often occurs within 2-4 weeks
  - Chronic forms cause recurring attacks; horses with the chronic form also become carriers
  - Pregnant mares may abort
- Infected horses are destroyed and the carcasses carefully disposed of
- Only buy horses that have been tested and found free of disease
- Control all bloodsucking insects
- Practice sanitation and sterilize all instruments used on horses after each horse
- No vaccine or treatment

Equine Influenza (Flu)

- Caused by viruses
- Spreads quickly where large numbers of horses are brought together
- Symptoms
  - High temp, lack of appetite, watery nasal discharge
- Young horses are more likely infected
- Isolate newly arrived horses and those that have the disease
- Treat with antibiotics and allow the animal to rest

Fescue Toxicity (Fescue Foot)

- Caused by, a fungus that grows inside tall fescue
- Fungus produces toxins that inhibit prolactin, a hormone that is essential to the last months of gestation for udder development and colostrums formation
- Can also cause lameness, sloughing off the end of the tail, poor weight gain, increase in temperature, pulse and respiration rate
- No treatment
- Remove animals from fescue pasture when symptoms occur

Founder (Laminitis)

- Nutritional disorder
- Common causes are overeating of concentrates, sudden change in feed, drinking to much water, standing in a stall for long periods of time
- May occur in chronic and acute forms
- Care in feeding and management help to prevent founder
- Cold applications should be used to treat the acute form
- Chronic cases are treated by trimming the hoof and shoeing the horse

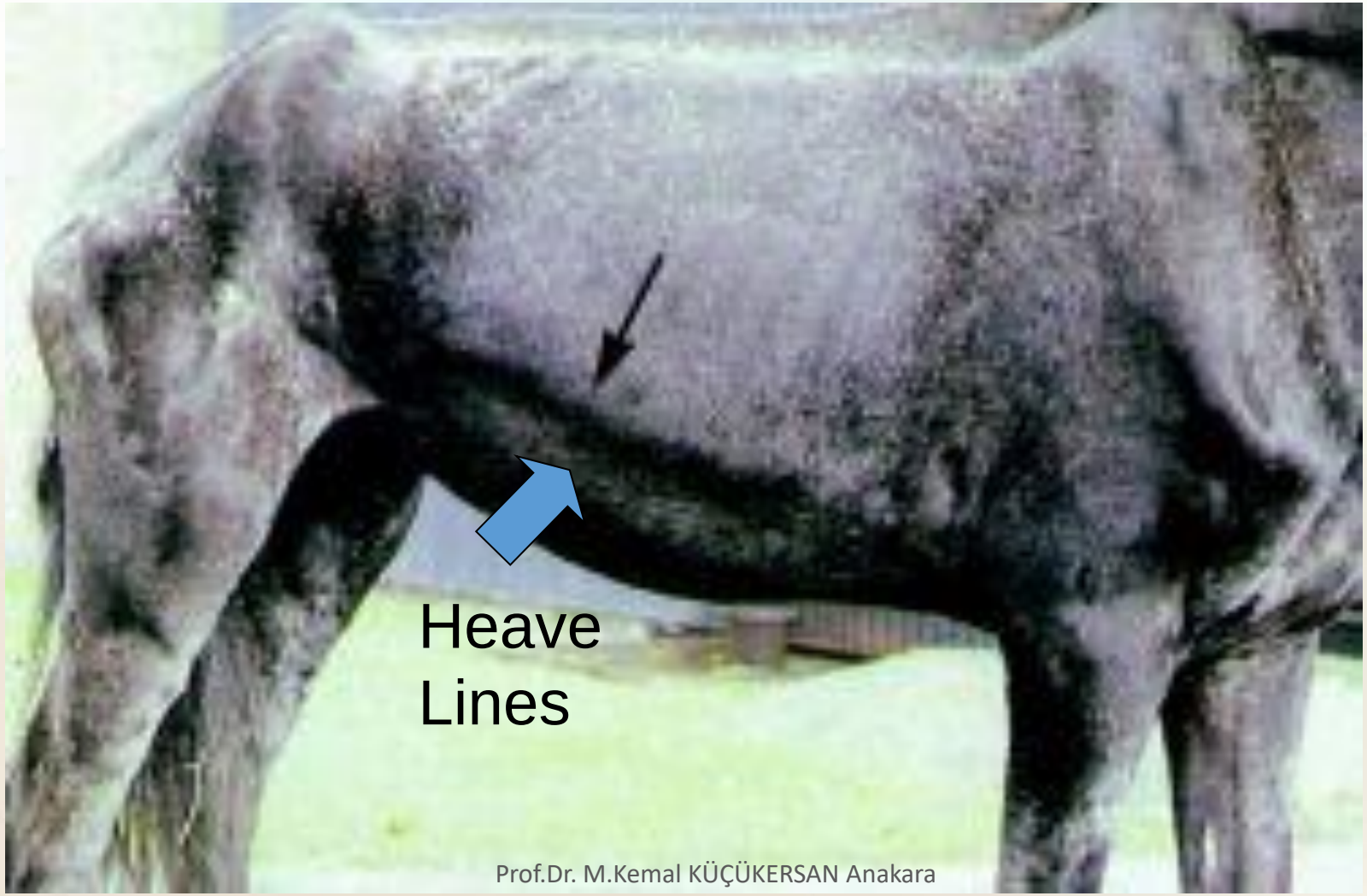
Acute Founder

- Swelling of the sensitive laminae on one or more feet, lameness, fever, sweating
- Distortion of the hoof

Heaves (Broken Wind, Asthma)

- Nutritional disorder that affects the respiratory system
- Often occurs when moldy or dusty feed is fed
- More common in horses over five years of age
- Affected horses have difficulty breathing, the air is forced from the lungs by the abdominal muscles, dry cough, nasal discharge, weight loss
- Best prevention is to use care in feed selection and never feed moldy or dusty hay
- Changing to a pelleted ration may help if the disease hasn't progressed to far.
- Putting the horse on pasture may also help
- No treatment for advanced cases

Heaves



Lameness

- Different causes
- Many of the unsoundness's of the feet and legs result in lameness

Navel Ill (Joint Ill, Actinobacillosis)

- Caused by bacteria
- Affects newborn foals
- Foal refuses to nurse and shows swelling and stiffness in the joints
- May have a fever
- Foal does not move around
- In older foals—loss of appetite, weight loss
- Sanitation and dipping the navel in tincture of iodine at birth help prevent navel ill
- Antibiotics are used to treat.

Navel Ill

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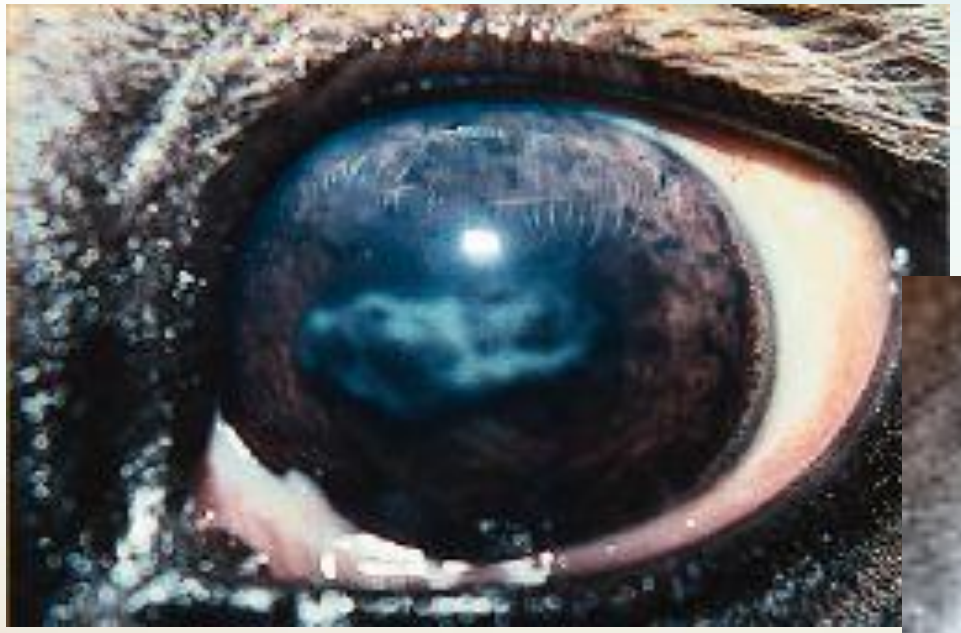
Periodic Ophalmia (Moon Blindness)

- Exact cause is not known
- Believed to be caused by infection
- Affects older horses more
- One or both eyes become swollen and the horse keeps its eyes closed
- Watery discharge from the eye
- Cornea may become cloudy
- Attack usually clears up in a week to 10 days
- The eye may not show much effect or the horse may be blind
- Attacks recur at periodic intervals

Moon Blindness



Pneumonia

- Caused by bacteria and viruses
- Stress increases the chances of infection
- Inhaling dust, smoke or liquids can also increase chances
- Sometimes occurs as a complication of other diseases
- Symptoms
  - Fever, rapid breathing, loss of appetite, chest pains
- Sanitation and prevention of stress will help prevent the disease

Rabies (Hydrophobia)

- Caused by a virus
- Enters the body when the horse is bitten by an infected dog or wild animal
- Affected horses become violent, drool and eventually become paralyzed and die
- Prevented by vaccinating dogs and controlling wild animals known to carry the disease

Tetanus (Lockjaw)

- Caused by bacteria
- Bacteria usually enter through a puncture wound
- Animal becomes nervous and stiff followed by muscle spasms and paralysis
- Death occurs in untreated cases
- Prevented by vaccination
- Unvaccinated horses are given tetanus antitoxin serum if injured

Vesicular Stomatitis

- Caused by a virus
- Horse drools saliva and blisters form in the mouth
- Provide water and soft feed
- No vaccination for the disease

External Parasites

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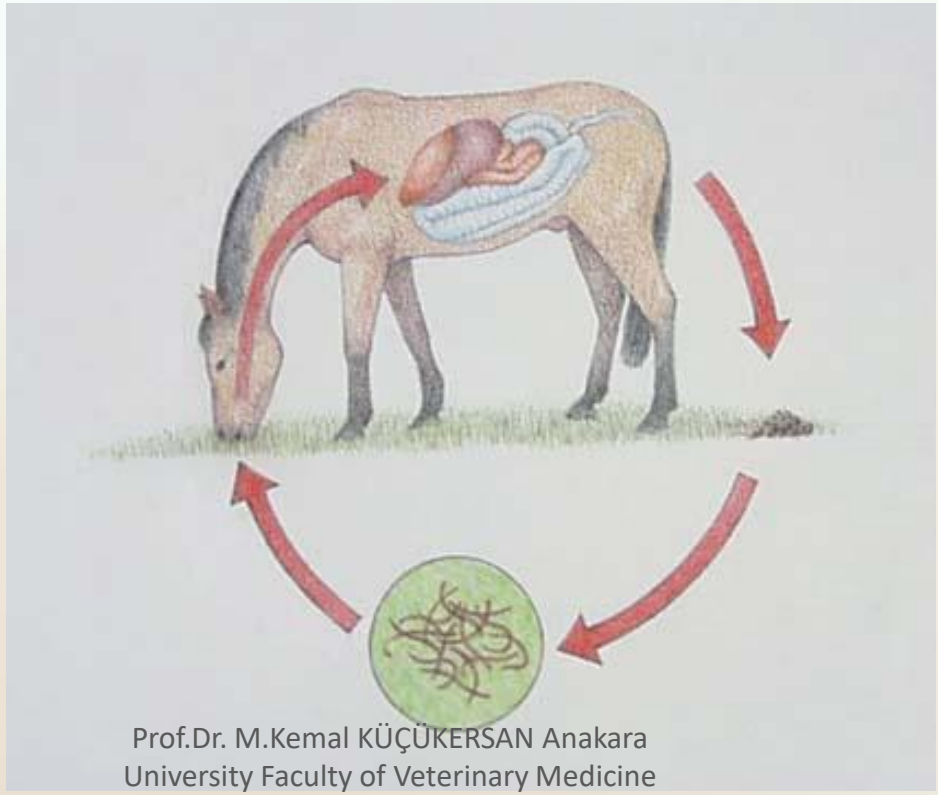
Common External Parasites

- Flies
- Lice
- Mites
- Ringworm
- Ticks
- Treatment and prevention was discussed in Unit 17

Horse Botflies

- Produce larvae that are parasitic to horses
- Leg eggs in the horses hair
- Damage can be both direct and indirect
- Controlled by killing the larvae in the stomach

Internal Parasites



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Internal Parasites

- Widespread, all horse are affected by them
- Heavy infestations lead to poor physical condition
- Extreme cases may cause death

Symptoms

- Weight loss
- Listlessness

and poor performance

- Dry, rough hair
- Poor appetite
- Bowel problems and colic
- Periodic lameness
- Breathing problems and coughing
- Anemia
- Foals that do not grow well and develop pot bellies

Diagnosis

- Only sure way is veterinary examination of both the horse and the feces
- Worm eggs revel what type of parasite is affecting the horse

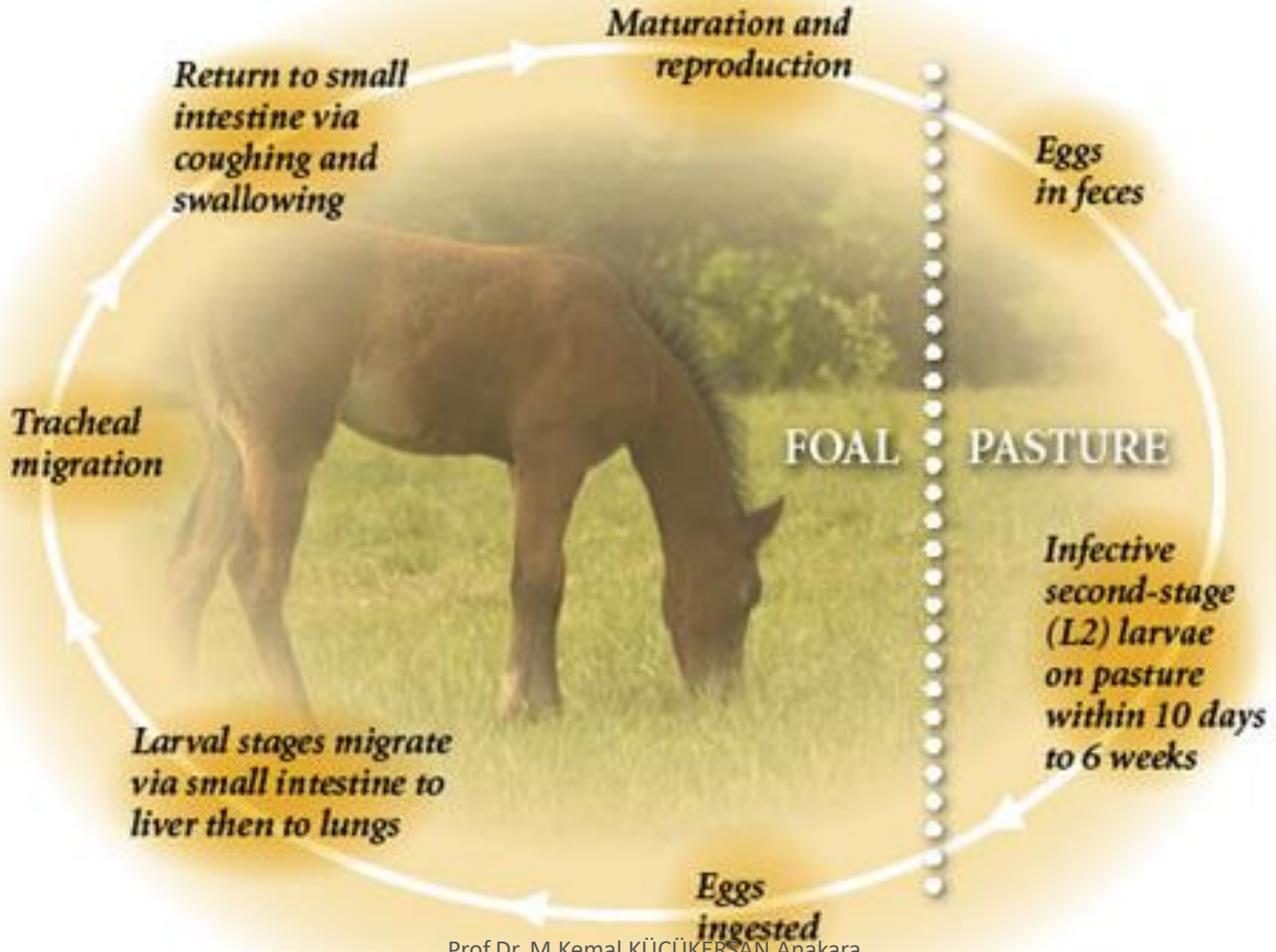
Treatment

- Drugs
- No one drug is effective against all the different parasites
- Worm medications can be purchased in several forms and administered in different ways

Life Cycles

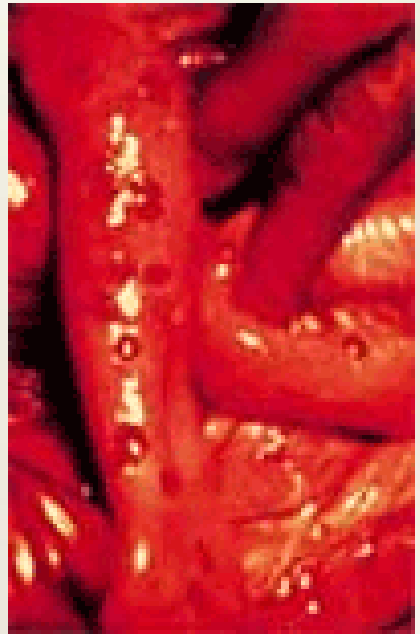
- Strongyles, ascarids, pinworms
- Eggs are passed out in the feces
- Eggs develop to infective stage on vegetation or in litter; or eggs hatch and larvae attach to vegetation
- Horse picks up infective eggs or larvae fro vegetation or contaminated litter or water
- Eggs hatch, larvae migrate through tissues of horses body
- Larvae develop into mature worms and lay eggs

Ascarids Life Cycle –10 to 12 weeks



Large Strongyles

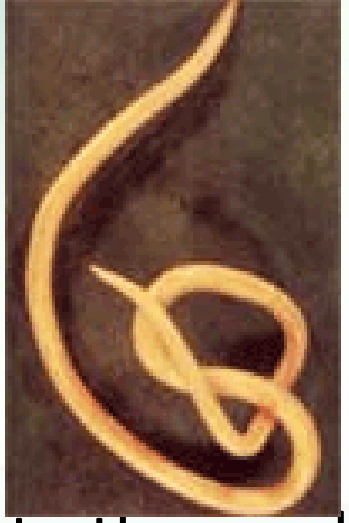
- Migrate to the arteries, liver, gut wall
- Adults are bloodsuckers
- Blood clots may form in the arteries, resulting in blockage and death
- Considered the most serious



Small Strongyle

- Larvae migrate to the intestine
- Cause digestive problems
- Not as serious as the large strongyle

Ascarids



- Migrate to the liver and lungs
- Later they are coughed up, reswallowed and go to the small intestine
- Not bloodsuckers
- Largest of the worms that affect horses
- May rupture the wall of small intestine and cause death

Pinworms

- Travel to the large intestine
- Do not migrate through other tissues of the body
- Cause irritation in the anal region
- Horse may rub the rear quarters to relieve itching, resulting in hair loss from the tail

Prevention

- Sanitation and good management practices are the basis of prevention
- Manure should not be spread on horse pastures
- Drag pastures to break up manure and expose it to sunlight
- Do not overstock pastures
- Alternate horses with cattle or sheep
- Feed hay and grain in bunks and feeders rather on the ground
- Keep the water supply clean
- Keep stalls clean

Summary

- Effects of disease and parasites are costly to horse owners
- Proper feeding and management help reduce loss
- Cleanliness and sanitation are the basis of prevention
- Proper exercise and grooming also help keep horses in good health
- Most serious equine diseases are distemper, encephalomylitis, equine infectious anemia, equine influenza

Summary

- Vaccinations are available for some diseases
- Common external parasites are flies, lice, mites, ringworm and ticks
- Serious internal parasites are strongyles, ascarids, pinworms and bots
- Insecticides are used to control external parasites
- Good management practices are used to break the life cycle of the internal parasite
- A regular worming schedule should be followed to treat internal parasites

Building a Horse Ration

- Start with horse needs
- Maximize forage
- Add energy if needed
- Add protein and minerals if needed
- Consider adding vitamins and supplements

Feed concentrate that makes-up the difference between nutrients needed & nutrients in roughage