

NUTRITION ASSOCIATED DISEASE

Sarel Van Amstel

Introduction

- ▣ Many approaches to camelid nutrition
 - No to free choice grain
 - No alfalfa
 - Assessment of grass hay digestibility
 - Choices and variability of feed supplements

- ▣ Extremes in body condition, health and productivity:
 - Many normal 3-3.5 BCS
 - Some over conditioning – obese 5/5
 - Too many - poor body condition (emaciation) – 1/5 BCS

Under conditioning

▣ Disease complex:

- Protein/Energy Malnutrition PEM (Failure to thrive/starvation)
 - Mobilization & Serous atrophy of fat stores
 - Fat stores including bone marrow turned into a gelatinous substance
 - Fluid effusion into body cavities
- Nutritional osteodystrophy (Rickets)
 - ▣ Osteopenia. Thinning of bones
- Trace mineral deficiencies

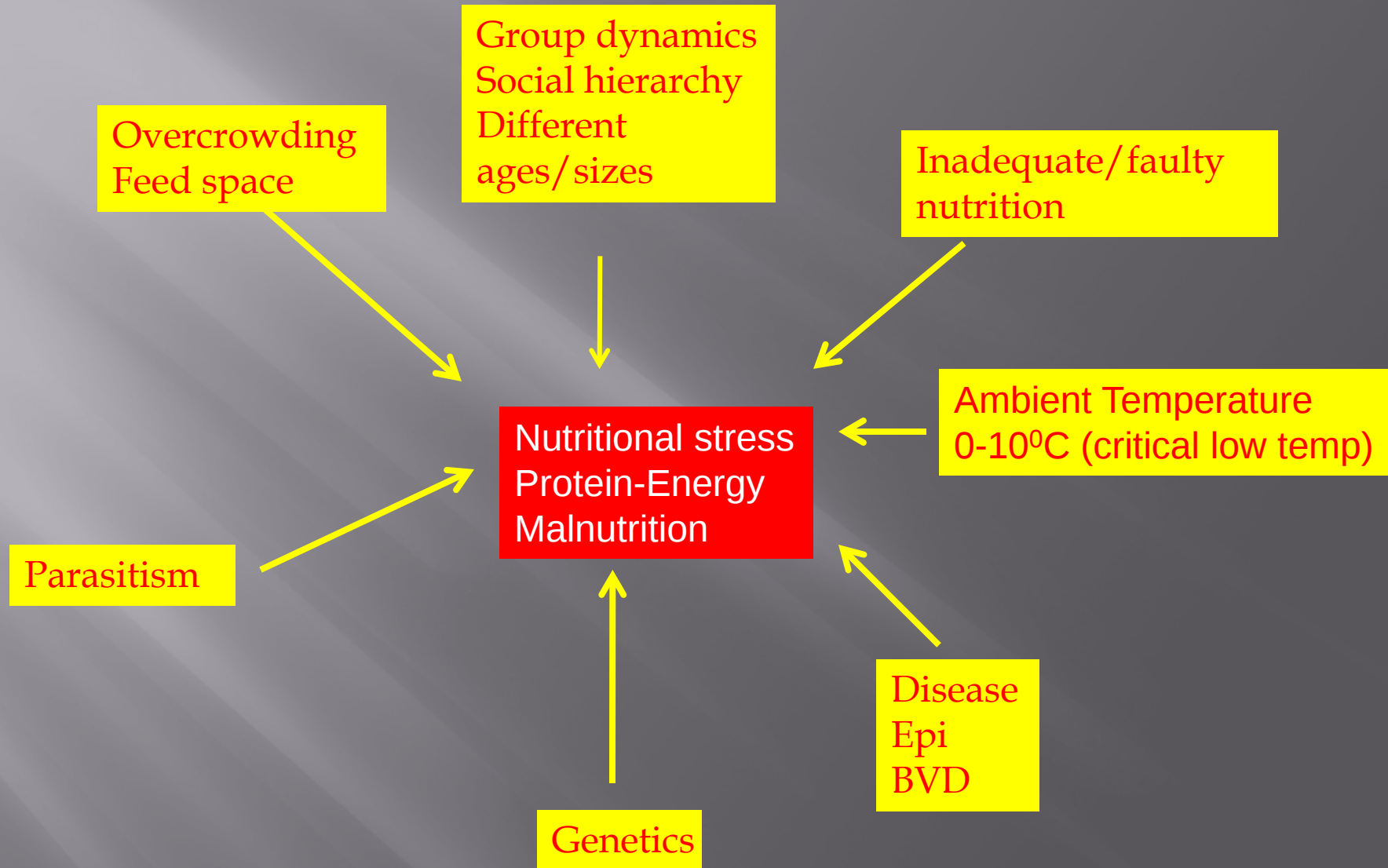


▣ PEM:

- Poor body condition. BCS 1/5
- Growing animals cessation of gain
- Weak often down acutely
- Normal or depressed appetite
- Pregnant, lactating females hepatic lipidosis
- Often mild non-regenerative anemia and hypoproteinemia
- Joints feel prominent & swollen costochondral junctions

PEM

- ▣ Animals predisposed
 - Pregnant/lactating
 - **Growth**
 - Geriatric



PEM

- ▣ Most common reason is poor quality forages
- ▣ Forage - principal dietary component
- ▣ 100 pound camelid should have access to 2 pounds of good quality dry grass hay per day
- ▣ Poorer quality hay; mix with alfalfa
- ▣ Alfalfa, mature
- ▣ Grain according to needs
- ▣ Other supplements

Obesity

- ▣ More common in llamas
- ▣ Feeding too high quality forage relative to requirements
- ▣ Overfeeding supplements – grain & readily fermentable fiber
- ▣ Predisposes to:
 - Heat stress
 - Metabolic disease
 - Infertility
 - Lameness - arthritis
 - Lactic acidosis (grain overload) – cracked corn, oats, barley or wheat in combination with low crude fiber (<12%)

PEM / Obesity control

- ▣ Body condition score/body weights every 4-6 weeks (3-3.5 of 5)
- ▣ Provide effective protective shelter during cold/wet conditions
- ▣ Forage analysis
- ▣ Feed lower quality forages before grazing pasture or increase stocking density/ grazing intensity/use mature pastures
- ▣ Attend to other predisposing causes:
 - Herd management
 - Parasitism
 - Dental /health checks

Polioencephalomalacia Vit B1 deficiency

- ❑ Thiamine deficiency common in camelids resulting in polio.
- ❑ Water soluble vitamins (B complex group including B1 - thiamine) produced by microbes in C1
- ❑ Predisposing factors include:
 - Excessive dietary sulphur or overdose with amprolium
 - Rumen acidosis – thiaminase producing bacteria
 - Thiaminase containing plants
- ❑ Clinical signs:
- ❑ Depression, seizures, blindness, hypersensitivity and sudden death
- ❑ Treat with Vit B1 (10-20 mg/kg)

Urolithiasis

- ▣ Over feeding grain –high in phosphate
- ▣ Lush grass pastures heavily fertilized with potassium
- ▣ Clinical signs:
 - Straining and inability to urinate
 - Dribbling urine
- ▣ Increase water consumption by adding salt to diet
- ▣ Urine acidification – ammonium chloride

Trace minerals

- ▣ 15 required. 5 associated with disease
 - Copper; iodine; iron; selenium and zinc.
 - Large proportion of forages deficient in zinc, selenium and copper but high in potassium which will depress magnesium uptake
 - Excess Ca in diet such as legume hays (alfalfa) will depress Zn intake

Trace minerals

- ▣ Well water
 - Can be high in sulfur and iron
 - ▣ Reduce Cu absorption
 - ▣ High sulfur can predispose to polio-encephalomalacia
 - ▣ Areas with rock phosphate can be high in fluoride
 - Chronic fluorosis.
 - Tooth decay
 - Chronic lameness due to fluoride deposition in bone

Trace minerals

- ▣ Disease states associated with mineral deficiencies:
 - Immune dysfunction – Cu, Zn, Se
 - Developmental abnormalities – Cu, Mn, I
 - Abortion Cu, I, Se
 - Retained placenta Cu, Se, I
 - Metabolic disturbances Co, I, Fe, Zn

Trace mineral supplementation

- ▣ Inorganic sources; sulfate and carbonate more bioavailable than oxide
- ▣ Organic forms are protected from gastric alteration thus highly bioavailable
 - Zinc methionine
- ▣ Nutrient delivery calculations
 - Amount fed x trace mineral content

Trace mineral supplementation

- ▣ Nutrient delivery calculations
 - None of mineral supplements and only 7/17 pellet supplements provide sufficient copper
 - 50% of mineral and pellet supplements provide sufficient selenium
 - 67% of mineral and pellet supplements have sufficient iron
 - Vit A & E generally adequately supplemented
 - Zn adequate in all mineral and 10 of 12 pellet supplements
 - 25% of all supplements meet vitamin D requirements

Trace minerals

▣ Zinc

- Normal immunity; skin integrity; fiber quality
- Can cause hair loss and hyperkeratosis on all body surfaces
- Secondary infection common
- Play a role in “munge”
- Diagnosed on skin biopsy – eosinophil infiltration diagnostic

Trace minerals

- ▣ Zinc supplementation
- ▣ Avalia – Zn 100. zinc-methionine.
 - Greater bioavailability
 - 0.5 gram/day

Trace minerals

- ▣ Copper (function)
 - Necessary for hemoglobin formation along with iron (Hypochromic microcytic)
 - Necessary for normal bone formation
 - Necessary for normal keratinization in the feet (pads & nails)

Trace minerals

- ▣ Copper (deficiency)
 - Interaction of molybdenum, sulfur with dietary copper results in lower availability
 - Anemia, altered hair coloration, impaired immune response and poor growth
- ▣ Copper (excess)
 - Causes hepatic necrosis without hemolysis
 - Copper conc. higher than 20mg/kg and 16:1 Cu:Mo ratio

Trace minerals

▣ Selenium

- Important biochemical component of enzyme system that protects body cell membranes against peroxidative damage (antioxidant)
- Clinical signs of deficiency: lameness; < activity; Dyspnea; colic; >suscept to heat stress; infertility
- Selenium supplementation @1mg/day/animal
- Soil should be tested for selenium
- Use BoSe strategically

References

- ▣ Van Saun, R. Camelid Nutrition. Trace mineral supplementation: what are our targets? 2010 Intl. Camelid Health Conf. for Veterinarians. Ohio State Univ. CVM
- ▣ Dr. Nancy A. Irlbeck. Basic of alpaca nutrition.

http://www.alpacaresearchfoundation.org/papers_reports/Basics%20of%20Alpaca%20Nutrition.html

Questions?

