Sheep nutrition and feeding

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Goals of sheep Nutrition

1. Increase of reproduction
2. Rearing of lambs
3. Milk production
4. Meat production

Key data of sheep breeding

Duration of pregnancy: 136-155 days

Duration of lactation: 3-4 months

Ovarian cycle: 16 days

Time of weaning: 30-40 days (early weaning)

3-4 months (mating yearly)

Body weight of a newborn lamb: 2.5-6 kg

Lamb nutrition: Colostrum

- Colostrum is the first milk produced by the female. It is rich in maternal antibodies and nutrition.
- Both the ability of the lamb to absorb antibodies and the supply of antibodies in colostrum decrease rapidly after birth.
- It is vital that the lamb receives its mother's first milk in the first few hours after birth for a high level of protection against disease.
- By 24 hours, a lamb loses the ability to absorb antibodies from the colostrum.
- Lambs need one ounce of colostrum per pound of body weight during their first 24 hours of life.

Young Lamb Nutrition

- For the first several weeks of life, all a lamb needs for nourishment is its mother's milk.
- Lambs will start to nibble on solid food soon after birth.
- 74% of the ewe’s milk is supplied in the first 8 weeks of lactation.
- A ewe's milk production peaks between 3 and 5 weeks of lactation.
- By the time lambs are 4 to 6 weeks old, they may be obtaining as much as 50 percent of their nutrient intake from sources other than their mother's milk.

Creep feeding

- A means of providing extra nutrients (usually grain) to nursing lambs – puts on extra pounds.
- Beneficial to lambs managed an intensive system in which early weaning is practiced.
- Advantageous in flocks that have a lot of multiple births or flocks where milk production is limited.
- It is more efficient to feed the lamb directly than to feed the ewe to produce more milk.
- Is of less value for lambs that will be developed on pasture.
- May not be cost-effective in all situations.

Creep feeding

- Start when lambs are 1-2 weeks old.
- Feed palatable feeds with small particle size: soybean meal, cracked or ground corn.
- 18-20 percent all-natural protein.
- Include a coccidiostat.
- Can include antibiotic.
- Fresh and dry. Don't let feed run out.
- Clean, fresh water
- Good quality hay.
- Feeders that the lambs cannot stand or play in.

Weaning

removing the milk diet

- Weaning age varies from less than 30 days to 6 or 7 months of age (natural weaning).
- Usually 60 to 120 days.
- Causes stress to lambs (nutritional) and ewe (mastitis).

Weaning: Lamb

- Leave lamb in familiar surroundings.
- Leave lamb in same group.
- Leave lamb on same diet.
- Vaccinate for overeating disease prior to weaning.
- Treat for coccidiosis prior to weaning.
- Maintain fence line contact with dam to minimize weaning stress(?).

Weaning: Ewe

- Feed low protein-low energy diet 5-10 days before weaning and 3-5 days after weaning.
- Restrict water intake before/after weaning (?)
- Wean cold turkey
- No special feeding or management is needed when lambs are weaned late or naturally.

Feeding after lambing

- Plenty of ice-free, clean, fresh water.
  - Some producers give warm water.
- Feed best quality hay.
- No grain first 24 hours after lambing.
- Gradually increase grain in lactation diet.

Feeding during lactation

- Ewe's highest nutritional requirements are during first 6 to 8 weeks of lactation.
- Highest percentage of feed bill.
- Energy and protein requirements increase by 30 and 55 percent, respectively.
- Ewes should have body reserves (fat) for optimum performance.
- Inadequate energy intake increases protein need.

Feeding during lactation

- Ideally, ewes should be separated into production groups for feeding.
- General rule of thumb is one lb. of grain per lamb or access to better pasture (quality and quantity).
- A loss of weight and body condition is acceptable (and expected).
- Yearlings should be fed and managed separately until they wean their first set of lambs.

Flushing: pre-breeding → breeding

- Start supplementing ewes a few weeks before the start of the breeding season, so that they are actively gaining weight.
- Continue feeding for the first several weeks of the breeding season.
- Flushing may increase lambing percentage by increasing the number of eggs that are ovulated.
- Flushing has more effect early in the breeding season, but may also improve embryo survival late in the breeding season.

„Flushing”

Goal: improvement of body condition

Nutrition: by „supporting” diet

(roughages + 0.3-0.4 kg concentrate)

Period: 2-3 weeks before the planned mating

Feeding method: roughage + concentrate (oat, rye!) = energy supplementation

P-supplementation: +10% for the optimal ovarian activity

ß-carotine : in good-quality roughages

Nutrition of ewes 1

2 feeding phases:

1. Extended maintenance requirement:
   a. „empty" (non-pregnant ewes),
   b. in the first 3.5 months of pregnancy.

Roughages (pasture grass, silage, straw) cover the requirement.

(They can take in 13-14% of the daily dry matter requirement.)

Nutrition of ewes 2

2. The first 3.5 months of pregnancy:

- better efficiency ratio (homeorrhetic control);
- lower transformation loss (anabolic effect of gestation).

Supplementation with concentrate:

- during „flushing”,
- in the last week of pregnancy,
- during milk production.

Nutrition of ewes during lactation

Requirement: extended maintenance
+ milk production

Crude fibre content of daily ration: 18-23%

Differences: between single lambs
and twins (or triplets).

Period of lactation: 3-4 months;

Persistancy of lactation: 60-70 days

Peak of milk yield: 3-4 weeks after lambing.

Body weight change < 0.5 % BW

Negative energy balance: weeks 3-5 of lactation

Feeding of ewes during weaning

1. 1 week before weaning:
   withdrawal of concentrate from the ewe;
2. 1 day before weaning:
   withdrawal of feed and water;
3. After weaning:
   water + roughage of low quality

Feeding of mother ewes 6 weeks before parturition:

Roughages + 0.3-0.5 kg concentrate

of 14% MP-content)

Feeding of mother ewes after parturition:

Good quality pasture

+ 0.5- 1.0 kg hay

+ 0.3-0.6 kg concentrate

Feedstuffs used in sheep nutrition

1. Green forages;
2. Ensiled roughages;
3. Hays;
4. Hay meals;
5. By-products of cereals during harvest;
6. Beets and potatoe;
7. Seeds;
8. Concentrates;
9. Supplementations.

Green forages

1. Pastures:
   - sheep are not „demanding”;
   - deep grazing („shaving”);
   - selection of toxic plants (Na-supplementation);
   - 6 to 8 hours of grazing per day;
   - leguminous plants (danger of blowing!);
2. Whole sugar beet
3. Cabbage

Silages

1. „Short term control”
   (20-25% DM, high C2-level);
2. Contaminated silages:
   by fungi of *Clostridia*, *Listeria sp*..

Recommendation:

- 3-4% of BW daily;

grass silage, sudangrass silage, alfalfa silage;

combinations with corn stalk and whole sugar beet

stalk of pea for mothers (protein, Ca).

Hays, hay meals

1. Meadow hays
2. Red clover hay
3. Sainfoin hay
4. Alfalfa meal (20-30% in concentrates for lambs)

Straws, by-products of cereals

1. Straws (wheat, barley, oat)
2. Corn stalk
3. Straw of pea and vetch (danger of mold!)

Beets and potatoes

Classical diet for not pregnant ewes:

1 kg beet

1 kg straw

1 kg hay

Carrots: for mothers

(to decrease the danger of abortion!)

By-products

1. Wheat bran
2. Soybean meal (for lambs)
3. Sunflower meal and rapeseed meal
   (for breeding animals)
4. Wet breweries
5. Sugar beet pulp (wet)
6. Tomatoe pomace

Additives

1. Urea (46%),
2. Feed salt (NaCl)
3. P-supplements
4. Na-selenite („white muscle disease")

Common diet for non-pregnant ewes:

1.5 kg silage or sugar beet pulp (dehydrated)

1 kg legume straw or low quality hay

1 kg cereal straw

- Before mating: 0.2-0.3 kg rye or wheat
- For ewes in good body condition: no extra need
- Pregnancy: in month 4: + 30% of energy (NE_m)
- in month 5: + 50% of energy (NE_m)

Dietary requirements of milking ewes

- Nutrient requirement should be covered by lactagogue feeds;
- Moisturous feedstuffs;
- Good quality hays;
- Cereal grain (or concentrate): 0.20-0.30 kg/day

Daily rations for sheep

Breeding rams:

1 kg moisturous feed

1 kg hay

1 kg pea straw

0.50 kg concentrate or rye

Weaned lambs (for breeding):

0.50 kg moisturous feed

0.50 kg hay

0.50 kg pea straw

+ 0.2-0.3 kg concentrate for lambs

Metabolic disorders and nutritive deficiencies of sheep

1. Rumen flatulence

   Causes:

   - most often by eating legumes rich of protein (green alfalfa);

   - animals are not accustomed to them.

2. Deficiency of vitamin E and selenium

Syndrome: pregnant ewes fed with a diet, which is poor of vitamin E and/or selenium often have lambs suffering of „white muscle disease";

lambs: thin, pulse and EKG are irregular, cause of death is waxy mucsle distrophy in sceletal and heart muscles.

Treatment: supplement of selenium (Na-selenite per os and subcutan) and vitamin E for ewes and one-day old lambs

3. White liver disease of lambs

- nutritional origin, mainly arises in spring;
- morbidity of 40%, mortality of 15%;
- acute form: 7-10 days; cronic form: 4 to 6 weeks;

Causes: deficiency of cobalt, that induces the deficiency of vitamin $B_{12;}$

In cronic case: propionate metabolism in liver is disturbed resulting accumulation of propionate;

- it might be accompanied by mycotoxin production.

3. **White liver disease of lambs** (cont.)

Acute form: inflammation of eyelids and lips

originated in liver caused by secundary photosensibility;

Cronic form: aneaemia,

high weight loss, *laesios* on the ears, decrease of albumin, cobalt and vitamin B_{12} of plasma.

- activity of AST, GGT and SDH significantly increase;
- degenerative fatty liver, necrosis of hepatocytes;
- haemosiderosis of spleen.

4. **Thiamin deficiency of growing sheep**

Syndrome: opisthotonus;

in the background: polyencephalomalatia (PEM) and cerebrocortical necrosis (CCN).

Occurance: generally in the age of 3 to 4 months.

Causes: high level of concentrate, no transisiton time (importance of preliminary feeding!);

In winter: hay containing antimetabolite of thiamine may induce it, number of thiamine-synthesizing bacteria is reduced in rumen.

4. Thiamin deficiency of growing sheep (cont.)

Symptoms: in the first 2 to 5 days, excited behaviour, animals lay down and hold their head straight upwards („stargaizing");

With no treatment: death in comatose status.

Similar symptoms: in listeriosis, ataxia caused by copper deficiency, scrapie.

Treatment:

- first dose of thiamin: 0.5-2.0 g/animal /day

(50% intravenous, 50% subcutan);

- recovery dose: 0.1-0.5 g thiamin/animal

5. Enterotoxemy of fattening lambs

Other names: „overeating disease", „pulpy kidney disease"

Occurance:

- suckling lambs;
- lambs fed with milk replacers;
- fattening lambs on high-concentrate diet;
- high-pregnant and lactating ewes.

Symptoms:

- pulpy kidneys (after necroctomy);
- toxins in rumen fluid.

5. Enterotoxemy of fattening lambs (cont.)

Results:

- sudden death caused by toxin of type D

  (or sometimes C) produced by *Clostridium perfringens* (it occurs also in the intestinal tract of healthy sheep);

- in the case of feeding a diet rich in starch and sugar (contentrate, milk, fresh grass) *Clostridium perfringens* proliferates.

Prevention: vaccine containing toxoids.

Pregnant ewes: passive immunity for suckling lambs at age of 4-6 weeks; later: antiserum for lambs.

6. Acute lactiC acid toxicity

Causes: high-concentrate diet with no preliminary feeding.

Results:

- concentration of lactic acid increases up to 2% in rumen fluid (normal: 50 mg%);
- pH in rumen: 4-4.2 (normal: pH 6-7);
- protozoa die in acid conditions in the rumen;
- high osmotic pressure develops (saliva, blood plasma);
- *collapsus* (preacute form), death.

6. Acute lactid acid toxicity (cont.)

In acute and semi-acute forms: metabolic acidosis;

increase of numbers of *Lactobacilli*, *Coli* and *Proteus* bacteria.

Symptoms: in the nervous system, small quanity of yellowish-green faeces, anuria, flatulence, breath smells very acidic.

Treatment: 20-50 ml of 5% NaOH solution intraruminally, reduction of inflammation, supply of thiamin.

Prevention: preliminary feeding of high-concentrate diet, feeding hay or straw before grazing.

7. Urolithiasis

Development of disease: split of *vesica urinaria*; urea flows into the abdominal cavity; „water belly"; death.

Occurance: castrated rams, fattening lambs on high-concentrate diet; increase of intake of Ca, P, Mg, K;

Grazing sheep: plants of high SiO_2-content.

Symptoms: sedimentation of minerals in urinary tract,

painful and slow urinating; phosphate content of urine increases.

Prevention: decrease of P-intake (Ca:P = 2:1);

Acidification of urine (0.5% NH_4Cl in concentrate),

Drench of 7-14 g NH_4Cl for 3-5 days; in grazing sheep: 3-4% NaCl in diet, water: *ad libitum*.

8. Urea toxicosis

Background: feeding of NPN-compounds to fattening lambs with no preliminary feeding;

Toxic level of urea: 0.4 g per kg body weight.

Treatment: drinking of 500 ml household vinegar (20%) diluted 10-20 times;

Intravenous injection of maleic acid containing glucose (0.5ml per kg body weight).

9. Pregnancy toxicosis in ewes (sheep ketosis)

Occurance: high-pregnant ewes.

Background: insufficient quantity of concentrate in diet; transitional glucose deficiency, energy eventually supplied from fat depots; pregnancy toxicosis (ketosis); long period of *hypoglucaemia* may cause damages in brain tissues.

Symptoms: unstable movement of high-pregnant ewes (faltering steps); comatose condition before death.

Necroctomy shows: healthy foetus(es) died before the ewe's death; yellow liver with rounded edges.

10. Milk fever in ewes

a. Classical (Ca ↑)
b. Not typical (P ↑)

Syndrome: see in dairy cow