
NUTRITIONAL MANAGEMENT OF THE
SHEEP FLOCK

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Feed for the ewe flock represents the largest production cost in a sheep enterprise. This means over-nutrition and using costly feedstuffs and ingredients is expensive and undesirable. At the same time, under-nutrition is also expensive due to lost productivity. Therefore, it is important to develop a nutritional management program for your flock that optimizes production while minimizing feed costs.

To develop such a program, it is essential to first define goals for your operation. Goals might include weaning two lambs per ewe or producing maximal returns.

The next component of a nutrition program is to understand the nutritional requirements of your ewe flock and how these change over a yearly production cycle.

Finally, determine how to meet the ewe flock needs completely and economically using available feedstuffs and appropriate supplements.

REQUIRED NUTRIENTS

There are five basic nutrient groups: water, energy, protein, minerals and vitamins. A deficiency in any one nutrient can reduce performance or productivity.

WATER

All sheep require an adequate supply of clean, fresh water. Water consumption will vary with climate and type of feed. Sheep drink more water during the summer, when on dry feeds, and during late gestation and lactation stages of production. They drink less water during the winter or when grazing succulent feeds or pasture. Do not expect sheep to meet their water requirements by eating snow or from ice covered water supplies.

ENERGY

Energy is the most common nutritional deficiency for ewes. Forages provide the primary, and in some cases, the sole source of energy. At production stages when energy requirements are increased (flushing, late gestation, lactation), you can supplement energy with concentrate feeds such as barley, wheat, oats, and corn. An energy deficiency can reduce conception rate, reduce lambing rate and milk production. It may also negatively affect wool production. Energy deficiency is linked to greater susceptibility to parasite infestation and is also the primary cause of pregnancy toxemia (ketosis) in late pregnancy.

Energy deficiency reduces rate of gain in growing animals. In severe cases, it causes weight loss or even death.

Excess energy intake also can reduce productivity. Over-conditioned (fat) ewes are reproductively less efficient and have more lambing difficulties. Excess energy intake is most likely to occur in ewes grazing highly productive pastures after weaning their lambs.

PROTEIN

The *quantity* of protein provided to ewes is more important than the quality or form in which it is provided. Providing too much protein is expensive and is an inefficient energy source. Diets should meet but not exceed the animal's requirements. Legume hays (12-20% crude protein) meet the requirements of mature ewes. Other excellent supplementary protein sources include oil meals such as soybean meal or cottonseed meal. You can use nonprotein nitrogen sources such as urea as a supplement if limited to one third of the total protein supplement and fed with a readily available energy source, such as barley.

Protein deficiency results in reduced feed intake, reduced feed utilization, decreased growth rate, lowered milk production, and reduced wool production. These symptoms are evident only in severe deficiency cases and are often associated with an energy deficiency.

MINERALS

The 15 essential minerals for sheep are:

Macro Minerals	Trace Minerals
Sodium	Iodine
Chlorine	Iron
Calcium	Molybdenum
Phosphorus	Copper
Magnesium	Cobalt
Potassium	Manganese
Sulfur	Zinc
	Selenium

Salt (sodium, chlorine) and dietary feedstuffs generally provide adequate macro mineral requirements (required in largest quantities). Check calcium and phosphorus levels to ensure that adequate levels are provided.

Most pasture, legume hay, and range forages provide adequate calcium but not phosphorus. Grains and protein sources are adequate to good sources of phosphorus and lower in calcium than forages. Therefore, most diets contain adequate calcium and phosphorus. Sources of supplemental calcium include limestone and dicalcium phosphate. Supplemental phosphorus sources include defluorinated rock phosphate and dicalcium phosphate. The ratio of calcium to phosphorus in the diet should be 2:1 or greater (not greater than 7:1). Ratios lower than 2:1 may increase the incidence of urinary calculi which most often occur in wether lambs on high grain diets.

Feeding a trace mineralized salt (TM salt) formulated for sheep usually provides appropriate amounts of trace elements. Be very careful when using TM salt formulated for other species. Sheep are especially sensitive to copper and levels of copper in salt formulations for swine are extremely toxic for sheep. Salt formulations for cattle can cause toxicity problems if dietary feedstuffs also contained measurable copper levels. Therefore, TM salt with no supplemental copper is recommended for sheep.

Selenium (Se) concentration is another difference between TM salts formulated for sheep and other species. The approved level for Se in a sheep salt mix is 90 ppm. Many commercial products today do not provide Se at this level. In areas of Se deficiency it is important to use TM salt that contains 90 ppm Se. The goal is to provide 0.7 mg of Se/day. A sheep will consume about $\frac{1}{2}$ oz of salt/day and 90 ppm salt will provide the 0.7 mg target.

VITAMINS

Sheep require the fat soluble vitamins (A, D and E) in their diet. Sheep also require B-vitamins, but these are synthesized in the rumen in adequate amounts and do not need to be supplemented. Good quality legume hay and green pasture contain adequate amounts of all the fat soluble vitamins. Poor quality hay and winter range are likely to be low in vitamin A, but fat stores usually are adequate to take the ewes through the winter. Feeding good quality alfalfa hay will provide vitamin A to sheep that may be deficient. Injectable A & D products provide only short term protection and may not be economical.

YEARLY PRODUCTION CYCLE

The nutritional year of the ewe flock has five periods: flushing, early gestation, late gesta-

tion, lactation, and maintenance.

FLUSHING

Flushing involves feeding the ewes a diet on which they will be gaining weight as they enter the breeding season. Its purpose is to increase lambing rates. A 10-20% increase is possible. Thus, flushing is one of the most cost effective management practices you can implement. Flushing is done either by supplementing the ewes with 0.5 lb of grain/ewe/day or by moving the ewes to a lush pasture that has been saved for flushing purposes. This increase in energy intake should occur 2 weeks before turning the ram in and should continue for 3 to 4 weeks into the breeding season. Over-conditioned ewes will not respond to flushing, and, if too fat, ewes may not conceive at all.

EARLYGESTATION

Early gestation represents the first 90-100 days of an approximately 150-day gestation period. Throughout the gestation, a 140-pound ewe will gain a total of 30-40 pounds. During the first 100 days however, ewes should gain only 10 pounds. This means she is gaining only 0.1 pound/day and therefore, her nutritional requirements are not greatly increased over maintenance levels. Providing

sufficient quantity of nutrients is most important at this time and the form in which they are provided is much less important. This stage of production is an excellent time to use lower quality feedstuffs such as crop residues (grain stubble), mature pasture and low quality hay.

LATEGESTATION

This is the most critical 6 weeks of the year for the ewe flock in terms of nutrition. About 70% of fetal growth occurs during this time. Rapid fetal development necessitates increased amounts of all nutrients, especially protein and energy. Remember that the growing fetus(s) takes up a large area in the ewe's body and in late gestation, the ewe's rumen capacity becomes limited. You must provide adequate quantities of nutrients during this time and the form in which they are provided is equally important. Feed nutrients in a form the ewe has the capacity to consume. Do not use low quality and nutrient-dilute feeds during late gestation. Energy is the nutrient most likely to be limited. To meet energy requirements, you must provide concentrate feeds. Supplement high moisture feeds, such as silage or haylage, with concentrates and dry forages to ensure adequate nutrient intake during this stage of produc-

① Sample Rations for Last 4-6 Weeks of Gestation (180-pound Ewe)							
Feed	Ration #	Expected Lambing Rates					
		130 ~ 150%			180 ~ 225%		
		1	2	3	4	5	6
Alfalfa hay		3.4 lbs	-	-	3.8	-	-
Legume-grass hay ¹		-	3.5	-	-	3.9	-
Grass hay		-	-	3.6	-	-	4.0
Grain ²		0.75	0.75	0.75	1.0	1.0	1.0
TM salt with Se ³		FREE CHOICE					

1 Assuming the grass hay contains 12% crude protein.

2 Barley, corn or oats.

3 Trace mineralized salt formulated for sheep should be supplied free choice.

② Daily Nutrient Requirements for a 180-Pound Ewe Suckling a Single Lamb or Twins During the First 6-8 Weeks Postpartum

Item	Single	Twins	Difference
Dry matter intake, lbs.	5.7	6.6	+15%
TDN, lbs.	3.7	4.3	+16%
Metabolizable energy, Mcal	6.1	7.0	+15%
Crude protein, %	13.3	14.5	+9%
Calcium, %	0.37	0.37	ND
Phosphorus, %	0.28	0.28	ND
Selenium, mg*	0.7	0.7	ND

* 90 ppm in salt.

Source: *Nutrient Requirements of Sheep*. NRC, 1985.

tion. Table 1 lists sample rations.

The level of required nutrients in late gestation also varies with the level of production expected in the flock. For example, energy requirements of a ewe flock with an expected 225% lambing rate are 20% greater than a flock with an expected lambing rate of 150%.

Poor nutrition during late gestation can have a drastic effect on the upcoming lamb crop. Ewes that were not adequately fed during the last 6 weeks before lambing are likely to have weaker lambs at birth resulting in a high lamb mortality rate. Subsequent performance of lambs born under these conditions is also likely to be reduced. Mammary development also occurs before parturition. If nutrition is not adequate, the ewe will not milk to her genetic potential.

Severe energy deficiency during gestation may lead to ketosis (also known as pregnancy disease, twin lamb disease). This disease

occurs in overly fat ewes as well as ewes receiving inadequate energy. Treatment of ketosis is often discouraging and many affected ewes die. Feeding a concentrated source of energy will prevent ketosis.

LAMBING

At lambing, ewes should have access to fresh, clean water. Ewes remaining in a lambing pen for 1 to 3 days should receive a high quality roughage. Gradually start ewes on lactation diets if they remain in the lambing pens for longer periods.

LACTATION

The highest daily nutrient requirements for ewes occur during lactation. Concentrate feeds will often be included in the lactation diets to meet these high requirements. An exception to this may be when ewes go directly to pasture with their lambs. Milk production peaks at about 28 days of lactation. The amount of milk produced is related

to the genetic potential of the ewe, her nutrient intake, and the amount of milk her lamb or lambs will consume. A ewe suckling twins will produce 20-40% more milk than a ewe with a single lamb. This additional milk production will increase the amount of feed she requires. Table 2 lists the requirements of a 180-pound ewe in average condition nursing a single or twin lambs during the first 6 to 8 weeks postpartum.

After 60 days of lactation, milk production will decline and the ewe's requirements also decline. The same feed intake level during late gestation should be adequate to meet the ewe's needs and prevent her from being over-conditioned. Table 3 lists examples of lactation rations which will meet nutrient requirements of a 180-pound ewe suckling single or twin lambs.

MAINTENANCE

Maintenance means weight equilibrium. At this production cycle stage, ewes are recover-

ing from lactation and have about 4 months to recover until rebreeding. Pasture is usually available and high in quality. Avoid over-feeding because fat ewes are less efficient reproductively. Bring over-conditioned ewes down in body weight during maintenance only. Do not try to reduce body weight after breeding.

RAMNUTRITION

The ram also requires adequate nutrition to optimize productivity. Poor nutrition may result in poor fertility and reduced vigor. During most of the year, the nutrients necessary to keep the ram in moderate condition will come from pasture or harvested forage. The ram should be flushed similarly to the ewes in preparation for the breeding season and supplementation should continue for a month into the season. The ram should also be prevented from getting fat. An over-conditioned ram will be less efficient reproductively.

3 Sample Lactation Rations for First 6-8 Weeks (180-pound Ewe)							
Feed	Ration #	Single lambs			Twins		
		1	2	3	4	5	6
Alfalfa hay		5.5 lbs	-	-	4.9	-	-
Legume-grass hay		-	5.1	-	-	5.3	-
Grass hay		-	-	5.3	-	-	5.5
Grain ¹		1.0	1.5	1.5	2.0	2.0	2.0
Protein supplement (40%) ²		-	-	0.2	-	0.3	0.5
TM salt with Se ³		FREE CHOICE					

1 Barley, corn or oats.

2 Cull peas, soybean meal, cottonseed meal or canola meal.

3 Trace mineralized salt formulated for sheep should be supplied free choice.



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