FEEDING EWES BETTER FOR INCREASED PRODUCTION AND PROFIT

Dr. Dan Morrical
Department of Animal Science
Iowa State University, Ames, Iowa

Introduction

Sheep nutrition and feeding is extremely critical to the success or failure of the ewe flock enterprise. As shepherds our task is to provide balanced rations to the ewes that meets their nutrient requirements on the least costly basis. Feed costs account for half the cost of producing lamb and wool. Therefore, cost control must always be foremost in the shepherd's mind. Sheep enterprises face a greater challenge in meeting needs of the flock because of the large within flock and between flock variation. This factor is best demonstrated by the requirements of ewes nursing singles, twins or triplets listed in table 1. This paper reflects the general guidelines for feeding ewes; however, each operation must adapt and modify these guidelines for their specific operation.

Nutrient Requirements

The amount of nutrients the sheep require is affected by several factors. These include ewe age and weight along with stage of production and level of production. Figure 1 outlines the stages of production, demonstrates how nutrient requirements change through the production cycle. It is important to realize that all ewes in the flock are not at the same stage of production on any given day. This factor is affected by the length of the breeding season and production system (once a year lambing versus accelerated lambing systems).

Critical phases of the production cycle include flushing/breeding as it sets the maximum drop rate for flock. Early/mid gestation is critical in that placental development occurs from day 30-90 of gestation. Placental size or weight effects nutrient transfer between the ewe and fetuses. Underdeveloped placenta results in smaller birth weights regardless of late gestation nutrition. Twenty days of severe underfeeding or 80 days of slight underfeeding will both retard placental growth. The remainder of this paper will deal with late gestation and lactation stages of production since in most flocks ewes are grazing during other production phases.

Late Gestation Nutrition

Determining how much to feed ewes in late gestation is a very difficult practice. Recent development with ultrasound scanning for fetal number allows for fine tuning the late gestation nutrition. The goal of late gestation nutrition program is to insure adequate nutrient intake for strong vigorous lambs of moderate birth weight. Additionally, ewes must enter lambing season in average to above average body condition to maximize milk production. Birth weight of lambs is critical to a successful lambing season. Small lambs have less resistance to cold stress and reduced pre-weaning growth. Big lambs increase the incidence of lambing problems and increases shepherd labor and lamb death loss. Fetal scanning and the separation of ewes into different feeding groups by those carrying singles, versus twins versus triplets or more helps to reduce the real big singles or small twins and triplets. Experienced technicians have accuracy's above 90% on fetal numbers so contracting an experienced scanner is the key to successful implementation of this technology.

The nutrients of greatest concern during late gestation feeding would be energy (TDN), crude protein (CP), calcium, selenium and vitamin E. The TDN level required is affected by the number of fetuses and cold stress. Winter lambing ewes generally cannot consume enough forage alone to meet their energy requirements. Thus, requiring the feeding of concentrates (corn).

Fetal growth accelerates rapidly during late gestation. Furthermore, energy required is much higher for the two weeks prelambing versus six weeks prelambing. A means of controlling costs is to step up grain feeding as lambing approaches. Ewes carrying singles require less grain and do not need to receive grain as early as those carrying multiples. Late gestation rations should begin 5-6 weeks prelambing for ewes carrying triplets and their ewes. Those with twins can be delayed to 3-4 weeks prelambing whereas those with singles can be held off until two weeks prelambing.

The absolute level of grain to feed is highly dependent upon the nutrient density of the forage being fed. Table 2 demonstrates the huge variation in nutrient density of hays. Nutrient analysis costs $10-$20 per sample and is money well spent. Balancing diets based on average or book values for hays is a risk progressive shepherds should not take especially in highly productive flocks. Furthermore, one can not accurately determine the nutrient density of hays with visual appraisal. Table 3 provides example rations for all phases of production with a wide array of forage sources. To minimize the risk of acidosis from excess grain feeding, ewes receiving over 1.5 pounds of concentrate per day should receive it in split feedings. Additionally, if hay does not need supplemented with protein or minerals than whole corn should be fed.

Selenium and vitamin E are both critical micro-nutrients for lamb survival and a smooth lambing season. Selenium can be added to the ration of sheep at .3 PPM or .3 mg/kg of feed. The maximum allowable selenium intake from supplemental sources can not exceed .69 mg per head per day. This is a very small amount and extreme care is required in calculating how much to add. More importantly selenium at 2 PPM can be toxic. Selenium status of ewes is dependent upon both the selenium concentration and intake of the mineral, along with the selenium level in the feedstuffs. Flocks with a history of selenium problems in newborn lambs should consider force-feeding selenium via the grain mix. This insures all ewes consume adequate amounts on a more uniform basis. If selenium is force fed, there should not be a free choice mineral source available. Table 4 shows the level of intake required for various selenium concentrations in the mineral or trace mineral salt. Selenium crosses the placenta so newborn lambs selenium status is totally dependent upon the selenium of their dams in late gestation.

Vitamin E, unlike selenium is not toxic. Vitamin E also does not cross the placenta so a newborns only source of E is ewe's milk or injections. The concentration of Vitamin E in ewe's milk or colostrum is directly correlated with the Vitamin E intake of the ewe. Vitamin E levels are extremely variable in feedstuffs because it denatures with storage and is also denatured in rumen as grain feeding increases. Although NRC states 50 international units of Vitamin E intake is adequate, multiple studies have shown improved lamb performance and livability too much higher E feeding levels. Unfortunately, high E supplementation does not show uniform, consistent results. Researchers have postulated this is related to the environmental stress during lambing. This creates a dilemma in that one must predict weather conditions to determine if additional E would be beneficial. Vitamin E is very cheap and therefore feeding 100 iu per fetus or lamb nursed per ewe per day is a preventative step that is money wisely invested.

Nutrition Disorders During Late Gestation

Ketosis or twin lamb disease is the most often discussed nutritional disorder that occurs during late gestation. In the Midwest, corn is really cheap and ketosis should never happen. The cause of ketosis is inadequate energy intake by the ewe resulting in fat metabolism (fat breakdown to feed the rapidly growing fetuses). Ewes which are most prone to ketosis would be those that are timid eaters or smaller ewes that do not consume their fare share of grain. Overly fat ewes also tend to be more susceptible to ketosis. I believe this is due to reduced intake capacity from internal fat and increased fat resources for breakdown. Granny ewes or ewes with poor mouths are also likely candidates for ketosis. Prevention is best accomplished by monitoring condition scores and keeping ewes from becoming obese. Thin ewes can be sorted off and fed separately so that they can be fed better and insuring that they are consuming their fare share. It is important that thin ewes are sorted out early enough to allow sufficient time (60d) for getting them to the correct condition score by lambing.

Vaginal prolapses Protein and energy are both critical nutrients for milk production. If either nutrient is fed below the requirement, milk yields and subsequently lamb gains will be reduced 10% or more depending upon the magnitude of the short fall.

I would suggest that almost all ewes lose weight during lactation, many over 35 pounds. This occurs because energy intake is well below requirements and ewes must mobilize body stores to sustain milk production. Weight loss during lactation is the critical reason that late gestation nutrition be adequate to insure ewes are in average or better body condition at lambing. Traditionally, fat mobilization during lactation was considered as a means of controlling feed costs. However, excess weight loss is not without its costs. Ewes losing less than .5 condition score during a 60-day lactation will not suffer in terms of milk yield. Since one condition score equates to an 11% change in body weight, a 200 pound ewe could only lose 11 pounds (200 x 5.5%). This value would equate too less than .2 pounds of weight loss per day. It would not be uncommon for many ewes to lose two to three times this amount.

Weight loss during lactation impacts protein requirements. The more weight ewes lose the higher their protein need. This situation is due to the ewe's ability to effectively mobilize body fat but having minimal ability to mobilize body protein for milk synthesis. With the current low cost of grain, it is economically wiser to feed more corn to limit weight loss versus feeding extra protein to balance energy from fat breakdown. It is also important to realize that fat conversion to milk is about 60% under protein and energy deficient rations whereas with adequate protein fed, fat conversion to milk is 80%. To demonstrate this relationship between protein requirements and weight loss, a ewe losing .5 pounds per day requires a lactation ration containing 21% crude protein. However, if the energy intake is increased to prevent weight loss, this ewe would require only 11.5% crude protein in their ration.

Lactation nutrition mistakes

One of the most common mistakes inexperience shepherds make is over feeding grain to the ewes in the lambing jug. This situation most frequently occurs when we try to accelerate the milk output in ewes that do not have enough to feed their lambs. This over feeding can create problems with acidosis and lead to less milk production rather than more. Newborn lambs probably do not consume more than 10% of their bodyweight in the first day or two of life, so it is not critical that ewes be pushed in while in the jug.

The next mistake that needs to be avoided is over feeding the ewes in the week to ten days before weaning. Many flocks routinely wean ewes while in the peak stage of milk production. It is critical that shepherds modify the pre-weaning diet of ewes to reduce mastitis problems. This is easily accomplished by cutting off the grain feeding for the last 10 days before weaning along with feeding low quality hay. This management input is trying to limit the ewe's protein and energy intake as both nutrients are required for milk production. Feeding straw for the last 2-3 days before weaning is further shuts down milk production. After weaning ewes should be maintained on low quality feed for 3-7 days to assist ewes in drying up. If ewes are fed by number nursed, it is important to move ewes to the next lower ration if they lose a lamb or lambs.

Summary

A wise county extension director told me once that when it comes to feeding livestock "one can not feed profit nor can one starve a profit". The important factors for profitable sheep production are controlling feed costs and increasing output. Either is pretty easy to do by itself doing both at the same time takes effort and planning.

Table 3. Example rations for ewes.

Examples rations for 175 pound ewes in various stages of production.

Feed Ingredient	Early/Mid Gestation				Late gestation, singles				Late gestation, twins				Late gestation, triplets				Lactation, singles				Lactation, twins			Lactation triplets	
Alfalfa Hay, eb	3.3				3.5		2.0		3.5		2.0		3.5		1.5		3.7		2.0		5.0	3.0		4.0	
Corn Silage[a]				7.0				10.5				10.5				9.0				10.0			13.0		13.0
Cornstalks			1.8				2.0				2.0				1.5				2.0			2.0			
Grass hay, mat.		3.0				3.0				3.0				3.0				3.0							
Corn					1.0	1.0			1.5			0.4	2.0		1.5	1.0	0.7				1.5			2.0	
Soybean meal		0.3				0.5						0.4			.75	0.5		1.4		0.5			1.0	0.5	1.5
Corn gluten feed			1.2				1.0			2.0	1.5			2.5					1.0			2.0			
Limestone						.02				.02	.02	.02		.02		.03		.02		.02			.02		.03
Dicalcium phos.																	.02	.01		.01	.02		.01		

Examples rations for 200 pound ewes in various stages of production.

Feed Ingredient	Early/Mid Gestation				Late gestation, singles				Late gestation, twins				Late gestation, triplets				Lactation, singles				Lactation, twins			Lactation triplets	
Alfalfa Hay, eb	3.6				4.0		2.2		4.0		2.2		3.5		2.0		4.5		2.0		6.0			6.0	
Corn Silage[a]				8.0				12.5				11.5				9.0				11.0			14.0		14.0
Cornstalks			2.0				2.2				2.2				2.0				1.5						
Grass hay, mat.		3.0				3.0				3.0				3.0				4.0				5.0			
Corn					1.0	1.2			1.5	1.8	0.7	0.5	2.2	2.0	0.5	1.0	.75	0.4			1.5	0.5		2.0	0.5
Soybean meal		0.4				0.5				0.6		0.5		0.7		0.5		1.0		0.6		1.5	1.0	0.5	1.5
Corn gluten feed			1.4				1.0				1.0				2.0				2.0						
Limestone			.02			.01				.03	.02	.02		.04		.03		.02		.02		.02	.02		.02
Dicalcium phos.						.02				.01							.03	.03		.01	.03	.02	.01	.02	.02

[a]Assumes corn silage has been fortified with limestone, dicalcium phosphate, sulfur and urea at ensiling time.

Rations were formulated based on nutrient content of feedstuffs listed below.

NAME of FEED	%D.M.	%CP	%TDN	%Ca	%P
Alfalfa hay, early bloom	89	18.0	65.1	1.23	0.26
Grass hay, mature	88	7.3	60.0	0.35	0.23
Corn stalks	65	5.0	59.0	0.57	0.10
Corn silage, Parker fortified	33	11.5	67.0	0.38	0.38
Corn	87	7.5	88.7	0.02	0.30
Soybean meal, 48%	90	52.5	84.0	0.30	0.70
Corn gluten feed, dry	89	20.0	72.0	0.36	0.82
Limestone	91			34.0	0.0
Dicalcium phosphate	97			22.0	19.3

Authors note: Rations are within a specific column for each stage of production, therefore most production phases have four distinct rations.