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Feeding Ewes Better for Increased Production and Profit

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Abstract

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.

Disciplines

Agriculture | Animal Sciences

Feeding Ewes Better for Increased Production and Profit

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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 most flocks 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. Adequate 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 3 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 hay 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 2 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 selenium 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 newborn lambs 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 the 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.

<u>Nutrition Disorders During Late Gestation:</u>

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 catabolism (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 are another problem that occurs more frequently in obese ewes. Ewe lambs carrying multiple fetuses are also more prone to vaginal prolapses. The main problem with vaginal prolapses is lack of space. Limiting hay intake and preventing obese ewes are two critical steps to reducing or eliminating vaginal prolapses. An example of limiting hay intake would be to feed ewe lambs a 50:50 hay concentrate ration versus an 80:20 ration, respectively. Producers who use round bales of hay or cornstalks have a bigger challenge relative to forage intake. Hay consumption from large packages can be controlled by limiting access to big packages for a set length of time each day. Precautions with restricted access include allowing plenty of feeding space around bales so all ewes have easy access. Otherwise, pushing and shoving will prevent timid or smaller ewes from their daily consumption. Processing the hay may also provide a means of reducing fill problems. The practicality of this practice is dependent upon hay price and equipment availability to handle processed hay.

Milk fever is different in sheep as compared to dairy cattle in that ewes develop symptoms prelambing. It has been my experience that the most likely candidates for milk fever are those carrying triplets. Classic symptoms of milk fever would be recumbent ewes that may or may not have their rear legs stretched out behind them. As one increases milk production via East Fresian crosses or increases flock prolificacy milk fever incidence may also increase. The differential diagnosis between ketosis and milk fever would be the effected ewe's response to calcium therapy. Ewes fed on rations with alfalfa as the primary roughage ingredient should have adequate calcium intake. Diets composed of corn silage or grass hay due to lower calcium levels have greater risks for producing milk fever.

<u>Lactation Nutrition:</u>

Lactation is the phase of production with the highest nutrient demand as shown in Figure 1. The amount of nutrients required is dependent upon the number of lambs nursed. Because of the huge differences in requirements the most important time to split the flock into production groups is during lactation. Lactation requirements are split into early and late in Table 1. Ewes peak in milk production around 21 days of lactation and should sustain high milk production levels through 6-8 weeks of lactation.

Nutrient requirements in table 1 are based off of projected milk yield when individual lambs are gaining .75, .65 and .5, respectively for singles, twins, and triplets respectively from birth to weaning. Calculations are based upon the a standard of four pounds of ewe milk being required per pound of nursing lamb gain when creep feed is available. If lambs do not have access to creep feed, five pounds of milk would be required per pound of nursing lamb gain. Using this standard one can assume a ewe nursing twins gaining a pound each and with creep feed access would be producing eight pounds of milk per day.

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 must 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 inexperienced 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 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. Lastly, 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 a 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 1. Nutrient requirements of ewes and rams.

Stage of Production	Body weight lb	Daily gain or loss	Dry Matter Intake lb	Dry Matter Intake % BW	Energy TDN lb	Energy ME Mcal	Crude Protein lb	Cal-cium grams	Phos-phorous grams	Vit. A IU	Vit. E IU
Maintenance	125	0.02	2.3	1.8%	1.26	2.07	0.22	2.3	2.3	2800	18
	150	0.02	2.6	1.7%	1.45	2.38	0.25	2.6	2.4	3210	19
	175	0.02	2.9	1.7%	1.62	2.66	0.28	2.9	2.7	3610	20
	200	0.02	3.2	1.6%	1.79	2.94	0.31	3.2	3.0	3990	21
	225	0.02	3.5	1.6%	1.96	3.21	0.33	3.5	3.2	4360	22
Flushing/ Breeding	125	0.22	3.4	2.7%	2.03	3.33	0.31	5.0	2.8	2800	23
	150	0.22	3.9	2.6%	2.32	3.80	0.36	5.7	3.2	3210	27
	175	0.22	4.4	2.5%	2.61	4.28	0.41	6.4	3.6	3610	30
	200	0.22	4.9	2.5%	2.88	4.72	0.45	7.2	3.9	3990	33
	225	0.22	5.3	2.4%	3.15	5.17	0.49	7.7	4.3	4360	36
Early/Mid Gestation	125	0.07	2.7	2.7%	1.47	2.41	0.25	3.0	2.5	2800	18
	150	0.07	3.1	2.6%	1.68	2.76	0.28	3.5	2.8	3210	21
	175	0.07	3.4	2.5%	1.89	3.10	0.32	3.9	3.2	3610	23
	200	0.07	3.8	2.5%	2.09	3.43	0.35	4.3	3.5	3990	26
	225	0.07	4.1	2.4%	2.28	3.74	0.39	4.7	3.8	4360	28
Late gestation **Singles**	125	0.2a	3.4	2.7%	1.89	3.10	0.39	5.4	3.2	5068	23
	150	0.2	3.9	2.6%	2.14	3.51	0.41	6.2	3.6	5811	27
	175	0.2	4.4	2.5%	2.38	3.90	0.43	6.9	4.1	6523	30
	200	0.2	4.9	2.5%	2.68	4.40	0.46	7.7	4.5	7210	33
	225	0.2	5.3	2.4%	2.91	4.77	0.49	8.4	4.9	7876	36
Late gestation **Twins**	125	0.2	3.6	2.9%	2.14	3.51	0.48	6.5	3.9	5068	25
	150	0.2	4.2	2.8%	2.47	4.05	0.51	7.5	4.4	5811	29
	175	0.2	4.7	2.7%	2.77	4.54	0.53	8.4	5.0	6523	32
	200	0.2	5.2	2.6%	3.08	5.05	0.56	9.3	5.5	7210	35
	225	0.2	5.6	2.5%	3.39	5.56	0.58	10.2	6.0	7876	39
Late gestation **Tripletts or greater**	125	0.2	3.7	3.0%	2.40	3.94	0.57	7.7	4.6	5068	27
	150	0.2	4.3	2.9%	2.77	4.54	0.60	8.8	5.3	5811	31
	175	0.2	4.8	2.7%	3.13	5.13	0.63	9.9	5.9	6523	34
	200	0.2	5.3	2.7%	3.50	5.74	0.66	10.9	6.6	7210	37
	225	0.2	5.7	2.5%	3.86	6.33	0.69	11.9	7.2	7876	42

Footnote: Birthweights are assumed to be 7.5%, 6.5% and 5.5% of dams bodyweight for singles, twin and triplets.

Stage of Production	Body weight lb	Daily gain or loss	Dry Matter Intake lb	Dry Matter Intake % BW	Energy TDN lb	Energy ME Mcal	Crude Protein lb	Cal-cium grams	Phos-phorous grams	Vit. A IU	Vit. E IU
Early Lactation **Singles**	125	-0.06	4.7	3.8%	2.38	3.90	0.66	8.1	6.1	5068	20
	150	-0.06	5.3	3.5%	2.75	4.51	0.71	9.3	6.9	5811	23
	175	-0.06	6.0	3.4%	3.07	5.03	0.78	10.5	7.8	6523	25
	200	-0.06	6.6	3.3%	3.41	5.59	0.86	11.6	8.6	7210	28
	225	-0.06	7.2	3.2%	3.74	6.13	0.93	12.6	9.4	7876	31

Table 1. Nutrient requirements of ewes and rams, pg 2.

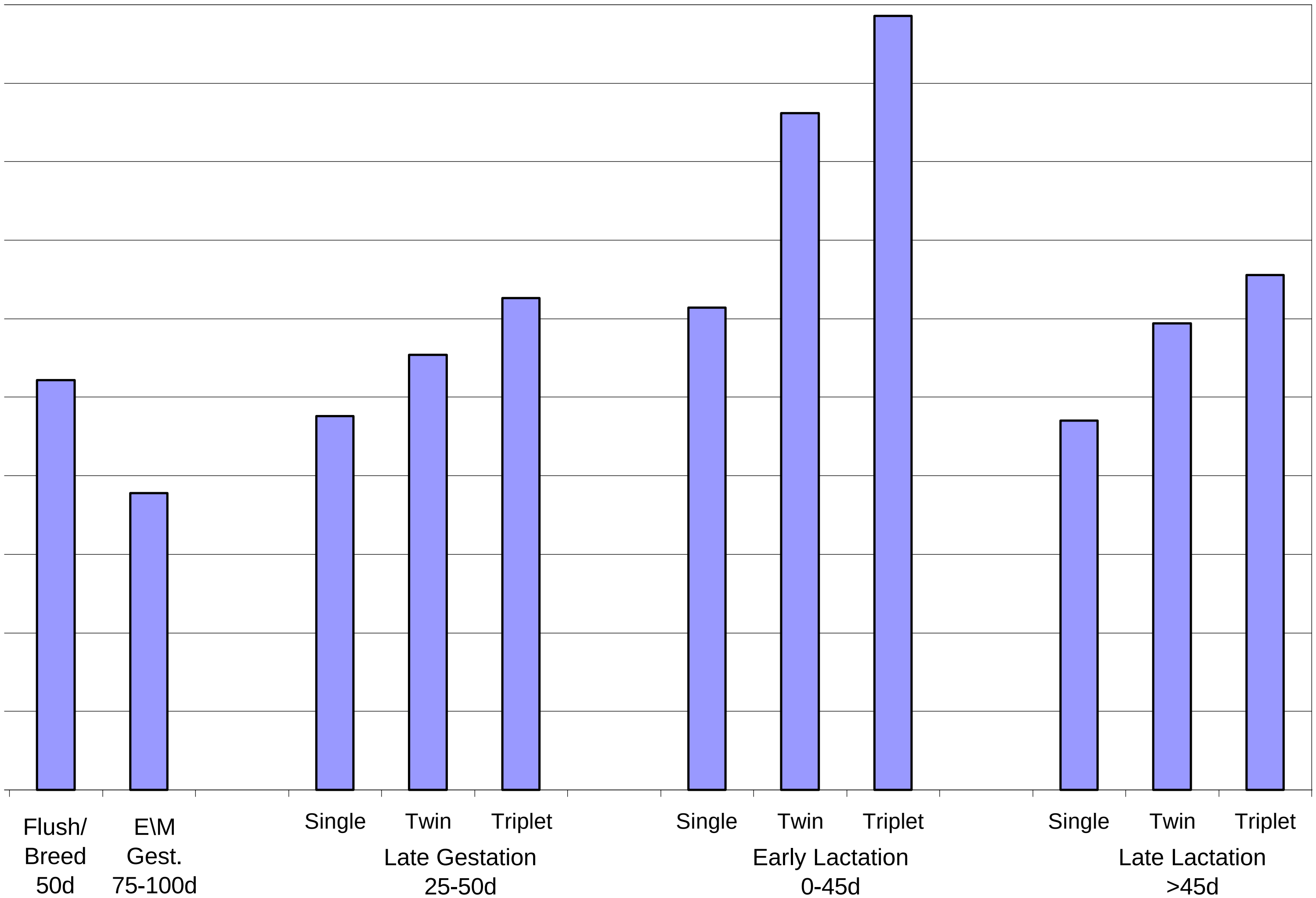
Stage of Production	Body weight lb	Daily gain or loss	Dry Matter Intake lb	Dry Matter Intake % BW	Energy TDN lb	Energy ME Mcal	Crude Protein lb	Cal-cium grams	Phos-phorous grams	Vit. A IU	Vit. E IU
Early	125	-0.13	5.3	4.2%	3.18	5.22	0.86	9.6	7.1	5962	20
Lactation	150	-0.13	6.1	4.1%	3.77	6.18	1.00	11.0	8.1	6836	23
Twins	175	-0.13	6.9	3.9%	4.31	7.07	1.13	12.3	9.1	7674	25
	200	-0.13	7.6	3.8%	4.86	7.97	1.27	13.7	10.1	8482	28
	225	-0.13	8.3	3.7%	5.44	8.92	1.41	14.9	11.0	9266	31
Early	125	-0.13	5.6	4.5%	3.41	5.59	0.92	10.4	7.6	6409	20
Lactation	150	-0.13	6.5	4.3%	4.19	6.87	1.11	11.9	8.7	7349	23
Triplets	175	-0.13	7.4	4.2%	4.93	8.09	1.31	13.3	9.8	8250	25
	200	-0.13	8.1	4.1%	5.71	9.36	1.51	14.7	10.8	9118	28
	225	-0.13	8.9	3.9%	6.45	10.58	1.70	16.1	11.8	9961	31
Late	125	-0.06	3.5	2.8%	1.82	2.98	0.44	5.1	4.2	3934	19
Lactation	150	-0.06	4.0	2.6%	2.10	3.44	0.48	5.9	4.7	4511	21
Singles	175	-0.06	4.5	2.5%	2.35	3.85	0.53	6.7	5.2	5067	23
	200	-0.06	4.9	2.5%	2.60	4.26	0.59	7.4	5.8	5600	25
	225	-0.06	5.4	2.4%	2.85	4.67	0.63	8.1	6.3	6118	26
Late	125	-0.13	3.8	3.0%	2.22	3.64	0.54	6.0	4.7	4381	19
Lactation	150	-0.13	4.4	2.9%	2.61	4.28	0.63	6.8	5.3	5023	21
Twins	175	-0.13	4.9	2.8%	2.97	4.86	0.71	7.6	5.9	5642	23
	200	-0.13	5.4	2.7%	3.33	5.45	0.79	8.4	6.5	6236	25
	225	-0.13	5.9	2.6%	3.70	6.07	0.87	9.2	7.1	6813	26
Late	125	-0.13	4.0	3.2%	2.34	3.83	0.57	6.3	5.0	4605	19
Lactation	150	-0.13	4.6	3.0%	2.82	4.62	0.68	7.2	5.6	5279	21
Triplets	175	-0.13	5.1	2.9%	3.28	5.37	0.80	8.1	6.2	5930	23
	200	-0.13	5.7	2.8%	3.75	6.15	0.91	9.0	6.9	6554	25
	225	-0.13	6.2	2.7%	4.21	6.90	1.02	9.8	7.5	7161	26
Replacement	70	0.50	2.9	4.1%	2.2	3.61	0.39	6.3	2.6	1495	19
ewes	90	0.40	3.4	3.8%	2.4	3.94	0.36	5.9	2.6	1923	21
	110	0.35	3.6	3.3%	2.5	4.10	0.35	4.8	2.4	2350	18
	130	0.30	3.7	2.8%	2.6	4.26	0.34	4.5	2.5	2777	22
	150	0.25	3.8	2.5%	2.6	4.26	0.33	4.6	2.8	3205	22
	170	0.25	3.9	2.3%	2.9	4.76	0.35	4.7	2.9	3632	22
Replacement	90	0.73	3.8	4.2%	3.2	5.25	0.56	7.8	3.7	1923	24
rams	110	0.70	4.3	3.9%	3.5	5.74	0.51	8.1	4.0	2350	25
	130	0.64	4.5	3.5%	3.6	5.90	0.48	8.4	4.2	2777	26
	150	0.55	4.9	3.3%	3.7	6.07	0.47	8.4	4.4	3205	27
	170	0.55	5.3	3.1%	3.9	6.40	0.48	8.5	4.6	3632	28
	190	0.55	5.8	3.1%	4.3	7.05	0.50	8.4	4.7	4059	29

Table 2. Example rations for 175 ewes in various stages of production.

Feed Ingredient	Early/Mid Gestation	Late Gestation Singles	Late Gestation Twins	Late Gestation Tripletts	Lactation Singles	Lactation Twins	Lactation Tripletts
Alfalfa hay (EB)	3.3	3.5 2.0	3.5 2.0	3.5 2.0	3.7 2.0	5.0 3.0	4.0
Corn silage	6.0	9.0	9.0	8.0	10.0	13.0	13.0
Cornstalks	3.0	2.0	3.0	2.0	2.0	2.0	
Grass hay	2.5	3.0	1.5	3.75	3.0		
Corn		1.0 .75	1.5 .75 1.5 .7	1.8 1.3 .9	.7	1.5	2.0
SBM	.3 .4	.75 .8	1.0 .7	.5 .9	1.4 .5	1.0	.5 1.5
Corn gluten feed	1.0	1.2	1.0		1.0	2.0	
Limestone	.02 .01	.02 .02	.03 .03	.03	.02 .02	.03	.03
Dical Phosphate					.02 .01 .01		

Table 3. Example rations for 200 ewes in various stages of production.

Feed Ingredient	Early/Mid Gestation	Late Gestation Singles	Late Gestation Twins	Late Gestation Tripletts	Lactation Singles	Lactation Twins	Lactation Tripletts
Alfalfa hay (EB)	3.5	4.0	4.0	3.75	5.0 5.0	6.0	6.0
Corn silage	7.0	12.0	12.0	10.0	12.0	16.0	14.0
Cornstalks	4.0	4.0	4.0	3.0	2.0		
Grass hay	3.0	4.0	4.0	3.75	5.0	5.0	
Corn		1.0 1.2	1.5 1.5	1.8 2.0 1.0	.7	1.5 1.0	2.0 .5
SBM	.40 .3	.6 .6	.7 .8	.2 1.0 1.0	1.0 1.0	.2 1.5 1.5	.5 2.0
Corn gluten feed	.7	1.6	2.0	2.5			
Limestone	.01 .01	.02 .02 .02	.03 .03 .03	.04 .04 .04	.02 .02	.02 .02	.02
Dical Phosphate		.01			.02 .02	.02 .02	.02



Total digestible nutrient (TDN) reqiuired by 175 pound ewes through their annual production cycle.

Table 3. Variation in forage quality from 1994 state wide Iowa forage survey.

Hay type	Crude Protein			TDN		
	Average	Low	High	Average	Low	High
Grass, 1st cut	11.6	6.1	20.7	55.7	46.6	75.2
Grass, 2nd cut	15.2	12.1	19.7	61.8	57.2	69.7
Alf/grass, 1st cut	13.9	8.0	22.3	56.1	41.0	75.1
Alf/grass, 2st cut	16.8	10.2	22.3	59.6	47.3	69.7
Alf/grass, 3st cut	18.3	10.9	22.3	62.4	49.1	72.5

Nutrient values are based on NIRS technique.

Table 4. Trace mineral salt or mineral intake required for .69 mg selenium intake[a].

Selenium concentration in Mineral	Intake, oz/head/day
10 PPM or .001	2.4
30 PPM or .003%	.8
50 PPM or .005%	.5
70 PPM or .007%	.33
90 PPM or .009%	.25

[a] Maximum allowable by FDA.