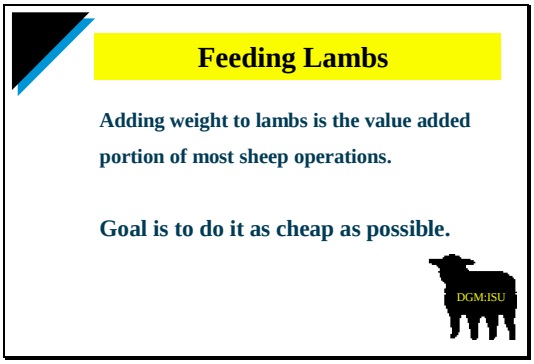
Slide 1

Slide 2



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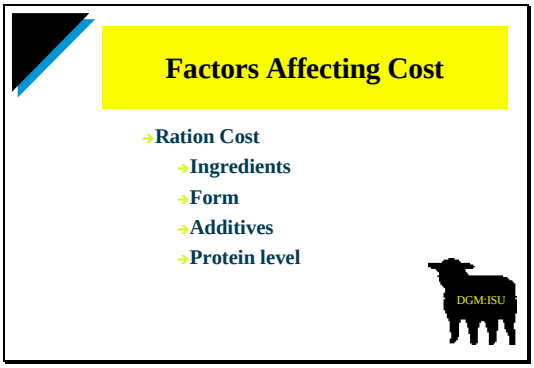
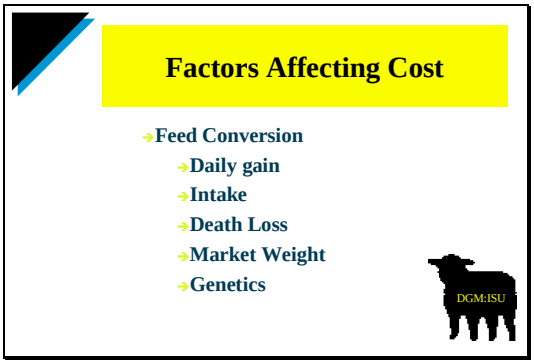


From University of Wisconsin-Madison Sheep Management ETN Web site
http://www.uwex.edu/ces/animalscience/sheep/

Slide 4



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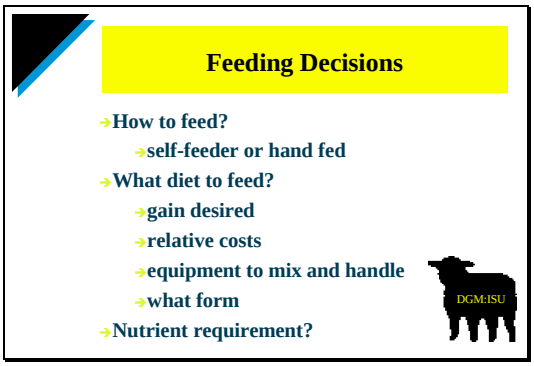

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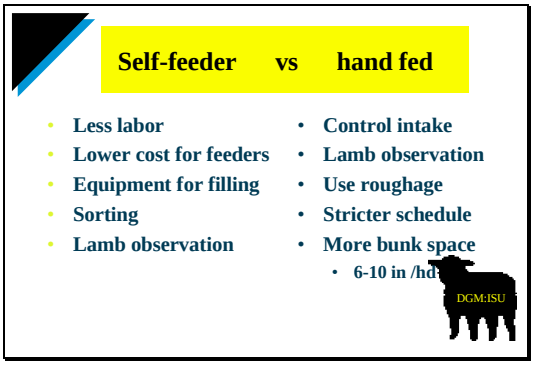

From University of Wisconsin-Madison Sheep Management ETN Web site
http://www.uwex.edu/ces/animalscience/sheep/

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What diet to feed?

- Gain desired
  - targeted marketing date
  - maximum gain most efficient

Ex. 50 pound lamb
2.5 intake = gain .64 & FE of 3.9
2.0 intake = gain .46 & FE of 4.3

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Comparison Shopping

- Ration cost has the biggest single effect on cost of gain
- Currently ration costs should be < $.07 per pound
- Compare on cost of gain basis not cost per pound of ration

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Cost of Gain

- Feed cost X Feed Efficiency
  $.07 X 6.5 = $45.50/CWT

All hay diet
$.05 X 12 = $60.00/CWT

From University of Wisconsin-Madison Sheep Management ETN Web site
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Example Corn vs Oats

Corn serves as the Standard energy source
$1.96 / bu / 56 = $.035 per pound
$.035 / 77% TDN = $.045 per pound TDN

Oats are worth:
32 pound bu X 68% TDN = 21.8 lb TDN/bu
21.8 X $.045 = $.86/ bu

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Byproduct feeds to consider

Corn Gluten Feed
18-20% CP and 75% TDN

Dried Distillers Grains w/ Solubles
29% CP and 78% TDN

Both have Ca:P ration concerns

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Standard Ration

- **Whole corn : pelleted protein supplement**
  - **superior FE**
    - **10-20% less feed**
  - **less processing cost**
  - **customized protein supplement**
  - **concern is sorting**

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Feed form and Intake Level on performance and carcass

Hamp Targee cross	Whole Corn	Pelleted Corn
ADG*	.76	.59
Feed Conversion	4.25	4.81
Dress %	52.6	53.0
BF	.27	.23
REA*	2.47	2.70

Fluharty etal. 1999

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Nutrient Requirements

- Affected by:
  - Weight
  - Sex
  - Genetics

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Important Nutrients

- Energy and Protein
- Calcium
- Phosphorous
- H_2O
- Selenium
- Vitamin E

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Nutrient Requirements

Protein varies the most

Lamb wt	Intake (lb.)/lamb	Daily Gains (lb.) .5	.6	.7	.8
40	2.4	15.9	17.0	18.6	**20.4**
55	2.9	13.4	14.7	15.8	16.9
70	3.1	12.8	13.9	14.7	15.5
85	3.4	12.0	12.7	13.4	14.3
100	3.6	11.4	11.9	12.6	13.3
>115	3.8	**10.8**	11.4	11.9	12.5

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Using the Information

- Sort lambs by weight groups
- Sort lambs by sex and/or growth potential
- Adjust protein concentration frequently (every 3 weeks)
- Market lambs when ready
  - how do you know

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How do you know what weight lambs should be ready?

65 % of average weight of dams on the dam and sire side.

Example:

Polypay ewe bred to Suffolk ram

(175 + 250) / 2 = 212.5

212.5 X 65% = 138 lbs

expected wt when lamb has .15 in. back fat

From University of Wisconsin-Madison Sheep Management ETN Web site
http://www.uwex.edu/ces/animalscience/sheep/

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Nutritional Disorders

- **Enterotoxemia/overeating**
  - poor vaccination program or bunk management
- **White muscle**
  - inadequate Vitamin e or selenium intake
- **Polioencephalomacia/thiamine deficiency**
  - screwed up rumen

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Additives

- **Coccidiosis**
  - Bovatec
    30 grams per ton

  or
  - Decox
    22.7mg/100lb
    about 10 grams / ton
- **Enterotoxemia**
  - chloratetracycline
    20-50 grams/ton

  or
  - oxytetracycline
    10-20 grams per ton

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Summary

- **Lamb feeding is common sense**
- **Nutrient requirements change**
  so should the ration
- **Goal is to produce cheap gains**
- **Lamb finishing is the value added portion of the sheep industry**

From University of Wisconsin-Madison Sheep Management ETN Web site
http://www.uwex.edu/ces/animalscience/sheep/

Lamb Nutrition and Feeding

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In most cases, farm flock operations in Iowa feed lambs from birth to market. The primary objective is to maximize rate of gain to get lambs to market as early as possible. Additional benefits of this strategy are improved feed efficiency and lower fixed costs. This goal, however, of maximum gain may no longer be the most desirable since the lamb market of late does not seem to be following historical averages with peak prices around Easter and high prices in May and June followed by falling prices through the remainder of the year. One must evaluate the most desirable marketing date and lambing season to determine the best method of feeding the lamb crop.

Creep feeding lambs is a very common practice that improves weaning weights 10-20%. Additionally, it allows for a smoother transition on to feed during the post-weaning period. Young lambs prefer feeds with relatively small particle size. As they get older, the physical form of diet they prefer is ever coarser. In most cases, feeding whole grains with pelleted protein supplements is far and away the easiest and cheapest means of finishing lambs, especially for operations without feed mixing and processing capabilities.

Young lambs find soybean to be very palatable with some producers using straight SBM for their creep starter. Many other producers top dress SBM on the creep to get lambs started. Other feeds high on the palatability scale for young lambs include corn, alfalfa hay and molasses. Table 1 contains some example creep rations using the previously mentioned feeds.

Lambs will begin to nibble on creep at 7-14 days of age. Consumption will be very low and keeping the creep feed fresh is the primary objective. Location of the creep can help or hinder lambs getting started. The creep should be easily accessible, close to the ewe flock and out of the

traffic flow, but very near it. Creep areas need to be well lit, clean and dry in other words one of the most comfortable locations in the barn. Creep areas serve another important function in that they provide a sanctuary for lambs to get away from the ewe flock. As lambs grow, creep gates need to be adjusted to allow lamb access yet continue to prevent ewe access. This is no easy task. Feeders used in the creep area need to be designed such that lambs cannot stand in the feeders to reduce exposure to coccidia.

As lambs approach weaning age, a management decision must be made on whether to switch lambs to the post-weaning ration before or after weaning. Weaning age directly influences this decision, ith lambs weaned at greater than 60 days of age, the switch can be made pre-weaning. However, with younger lambs, the change needs to occur after weaning. An additional factor to consider is the cost of creep ration compared to the grower/finisher ration.

Critical components of the creep ration include palatability as previously discussed. Most commercially available lamb feeds contain Bovatec (Roche) which is an ionophore that improves feed efficiency (3-5%) and controls coccidiosis. The Roche technical manual indicates that lambs should consume 15-80 mg of Bovatec per day. In very young lambs, this level of intake (1 pound) is impossible due to their bodyweight. In most situations, prevention of coccidiosis in very young lambs requires strict sanitation and management along with a much more aggressive strategy to increase Bovatec intake. One must note that FDA allows the maximum level of Bovatec incorporation into the feed at 30 grams per ton.

Selenium and vitamin E are two nutrients that must be incorporated into creep rations. White muscle or stiff lamb disease is the common name referring to deficiencies of either/or both selenium and vitamin E. Iowa soils and therefore, feedstuffs tend to be deficient in selenium. All lamb rations should be fortified with at least .18 grams of selenium and 15,000 international units (IU) of vitamin E per ton of complete feed. One quickly realizes that .18 grams is a very small (.000397 lb.) amount to incorporate into a ton of feed. Therefore, accurate scales and thorough mixing are critical since 2 parts per million (PPM) can be toxic (.0044 pounds). Vitamin E however, is not toxic and can be increased in the ration to help overcome a shortage of selenium.

Creep consumption by young lambs may not provide adequate selenium or vitamin e intake relative to their requirements. Many sheep operations routinely administer injectable selenium and vitamin E to lambs as additional insurance in combating a deficiency. Two important points are critical to remember, one being vitamin E stores in the body are very low and secondly, serum vitmain E levels drop very rapidly to pre-injection levels (5-8 days). Lastly, very little vitamin E crosses the placenta so colostrum or an injection is the lamb's only means of getting vitamin e.

Common Nutritional Disorders

Urinary Calculi (UC)

As previously stated, maximum gain is generally the objective when feeding lambs. This requires the feeding of high concentrate diets that results in a poor calcium to phosphorous ratio. This is due to grain being very low (<.05%) in calcium. All high grain rations should be fortified with calcium by adding 1- 3% limestone to the ration. Additional methods of preventing UC include adding 10 pounds of salt and 6-10 pounds of ammonium chloride or sulfate per ton of ration. Clean, fresh water sources reduce UC by increased water intake and urine output which serves to flush out the urinary tract. An additional benefit with increased water intake is a corresponding increase in intake and performance. During cold weather it is critical to provide a warmed water source to encourage consumption.

Enterotoxemia (Overeating)

Overeating (OE) is one of the most common causes of death in feedlot lambs. Management inputs to minimize OE include gradual ration changes, vaccination programs and feeding 20 grams per ton of oxytetracyline (OTC) or chloratetracycline (CTC). Neither antibiotic is cleared to be feed with Bovatec. Lambs being fed on self feeders must always have feed available once they are adapted to self feeders. Flocks using hand feeding should monitor daily consumption and adjust feed offered so that lambs are just slightly hungry. In farm flock operations, annaul boosters to ewes during late gestation along with lamb vaccinations at 3 and 6 weeks of age provides the best possible protection through weaning. Careful administration of vaccine (clostridium perfringens type C & D toxoid) along with appropriate handling and storage of the vaccine increases the efficacy of the vaccine products.

Polio Encephalomacia (PEM)

Polioencephalomacia is a thiamin deficiency that usually occurs following a digestive disorder. Symptoms of PEM are neurological, with staggers, blindness and convulsions being the most common. Lambs will eventually go down flat on their side, paddle and arch their head over their back. Examples of situations which might create PEM include poor communications that results in a double feeding or lambs getting out and having free access to stored feed. The best indicator of PEM is the response to thiamin injections. One should see rapid responses, however, if digestive upsets created the problem, supplemental thiamin injections may need to be continued for several days until the digestive health of the animal has returned to normal and eating aggressively.

Self feeding Versus Hand Feeding

There are advantages and disadvantages of both systems. The biggest disadvantage of self-feeding is that monitoring lamb health is more difficult. This is because lambs are not actively eating at any one time and requires the shepherd to move through the pen(s) observing lambs for signs of illness. Hand feeding requires more bunk space, however, unless the ewe flock is dry-lotted, feeders previously used to feed ewes can be used for the lambs. Lambs require 9 to 15 inches of bunk space per head. The higher space requirements are for heavy lambs (>120 pounds) or lambs in full fleece. Hand feeding does require more labor and should be done in two equal feedings each day. Ideally, feeding times should be similar from day to day as lambs become accustomed to a specific feeding schedule. An additional advantage of hand feeding is the incorporation of hay into the ration. At times hay can be a very economical ingredient to include in the ration at 10-20 percent of the total ration.

Cost Control Measures

Generally when discussing feed cost of gain, one first considers the cost of the ration as the biggest factor. Ration costs are currently very low and furthermore should stay low in future due to incredibly high inventory of grains. Even today with our cheap grain prices there may be some byproduct feeds that can cheapen the ration even further. An example might be dry corn gluten feed. It is important to shop around for under utilized (cheap) feed resources in the area.

Protein requirements of native lambs are high and therefore, result in a higher percentage of the total ration cost due to protein in the ration. As lambs reach heavier weights, their protein requirement decreases (Table 3) so frequently adjusting protein content downward can reduce feed costs. An additional means of reducing protein costs is to investigate cooperative purchasing of commercially available protein supplements or ordering a custom protein supplement. In most cases, a minimum of three tons is required for custom orders. Table 2 contains the custom protein supplement formulation used at the McNay Research Farm along with feeding directions. Incorporating alfalfa hay into the finishing ration may also provide a cheaper protein source. Feeding rations with more than 10% hay will result in slower growth rates and poorer feed conversions. This may result in a higher feed cost of gain even though the ration cost per ton is lower.

Other means of reducing lamb feeding costs would include timely marketing of finished lambs. Refer to Jeff Held's article last month for more information. As lambs reach market weight they become much less efficient and feed cost of gain increases dramatically. Another way to improve growth efficiency is to use large framed terminal sires because their offspring have better efficiency than small or medium frame lambs. Death loss during the finishing phase of production also impacts feed cost of gain. Preventive health programs addressing individual flock health problems, which have occurred in the past, is money well spent. The last area that is not often discussed relative to controlling feed cost of gain is to minimize waste. With appropriately constructed feeders, this should not be a problem. Feed spoilage due to poor storage or sloppy transport from storage to feeders could increase cost of gain 2, 5 or even 10 percent.

The objective of lamb feeding programs is to provide low cost diets which are balanced and therefore result in rapid and efficient gains. Frequently adjusting the protein concentration in the ration will reduce cost. Many factors impact the feed cost of gain and all areas must be addressed in today's market to insure profitable lamb feeding.

Table 1. Creep, Growing and Finishing Rations.

Ingredient	Creep Feeds			Grower Rations						Finisher			
Corn, lb.	1470	1015	1240	1500	1375	1435	1170	1235	1000	1750	1675	1535	1170
Oats, lb.		400					300						
SBM (49%), lb.	370	425	600			450	415	360	270			160	
ISU Lampro 42, lb.				500						250			
Comm. Protein 34, lb.					625						325		
Corn Gluten Feed, lb.								600					700
Alfalfa Hay EB, lb.								300				200	
Molasses, lb.	100	100	100			60	60	60	60			60	60
Limestone, lb.	40	40	40			35	35	25	50			25	50
Ammonium Sulfate, lb.	10	10	10			10	10	10	10			10	10
Trace mineral, lb.	10	10	10			10	10	10	10			10	10
Selenium (grams)	.2	.2	.2			.2	.2	.2	.2			.2	.2
Vit. A, 1,000,000 IU	yes	yes	yes			yes	yes	yes	yes			yes	yes
Vit. D, 100,000 IU	yes	yes	yes			yes	yes	yes	yes			yes	yes
Vit. E IU	35,000	35,000	35,000			20,000	20,000	20,000	20,000			20,000	20,000
Antiobiotic or Bovatec, respectively (grams)	50 or 30	50 or 30	50 or 30			50 or 30	50 or 30	50 or 30	50 or 30			50 or 30	50 or 30
Calculated Nutrient Content (Dry Matter Basis)													
Crude Protein, %	16.7	18.4	21.0	18.1	17.9	18.0	18.0	18.0	18.1	13.4	13.4	13.4	13.3
Total Dig. Nutrients, %	83.4	81.0	82.7	83.7	80.6	83.4	81.9	79.9	80.8	85.3	83.6	81.5	80.9
Calcium, %	.84	.84	.86	1.11	1.14	.74	.74	.75	1.02	.57	.61	.66	.99
Phosphorous, %	.38	.40	.43	.39	.43	.41	.41	.39	.57	.37	.39	.35	.56

Table 2. Protein supplement formulation fed at the McNay research farm.

ISU LamPro 42[a]

Ingredients	Amount
Soybean meal, 49%	1340
Blood meal	200
Limestone	220
Molasses	100
Ammonium sulfate	70
Trace Mineral salt[b]	70
Selenium premix[c]	1.3 grams
Zinc[c]	300 grams
CTC or Bovatec	200 grams
Vitamin A, IU of activity	7 million
Vitamin D, IU of activity	800,000
Vitamin E, IU of activity	150,000

Nutrient density, as fed basis	
Crude Protein	42.4%
NEm (mcal/lb)	.69
NEg (mcal/lb)	.46
Calcium	3.88%
Phosphorous	.54%
Selenium (ppm)	1.27

[a] Supplement is to be fed with whole corn.

[b] Should not contain added copper.

[c] Reduce this amount equal to that supplied by trace mineral salt.

The supplement shown above when fed with corn in the following ratios provides the nutrient levels listed below. Assumes corn is 8.5% CP on DMB.

Corn	Supp.	Crude protein	Ca:P ratio
4	1	16.2	2.35
6	1	14.0	1.74
8	1	12.8	1.38
10	1	12.0	1.15

Please be advised that these are very high energy rations.

Table 3. Suggested protein levels for lamb rations as affected by lamb daily gain and weight.

	DM Intake	Daily Gains (lb.)			
Lamb Weight	(lb.)/lamb	.5	.6	.7	.8
40	2.4	15.9	17.0	18.6	20.4
55	2.9	13.4	14.7	15.8	16.9
70	3.1	12.8	13.9	14.7	15.5
85	3.4	12.0	12.7	13.4	14.3
100	3.6	11.4	11.9	12.6	13.3
115 and heavier	3.8	10.8	11.4	11.9	12.5

Protein supplement formulation for Tom and Mary Cory farm.

Ingredients	Amount
Soybean meal, 47.5%	1340
Blood meal	200
Limestone	220
Molasses	100
Ammonium chloride	70
Mixing salt	70
Magnesium oxide	10.5
Sodium sulfate	7.7 May be deleted not needed
Zinc sulfate	4.2 May be deleted not needed
Cobalt carbonate	175 grams
Manganous oxide	98 grams increase to .7 pounds
Potassium iodide	7.7 grams
Sodium selenite (.6%)	7 pounds
Vitamin A, IU of activity	7 million/ton supplement
Vitamin D, IU of activity	800,000/ton supplement
Vitamin E, IU of activity	150,000/ton supplement
Deccox, 6%	4 pounds

Calculated Nutrient Density, as fed	
Dry matter	91.8%
Crude Protein	41.2%
Total Digestible Nutrients	59.3%
Calcium	3.87%
Phosphorous	.44%

[a] Supplement is to be fed with whole corn.

The supplement shown above when fed with corn in the following ratios provides the nutrient levels listed below. Assumes corn is 8.5% CP on DMB.

Corn	Supp.	Crude protein, DMB	Ca:P ratio
5	1	15.0	2.00
6.5	1	13.5	1.63
8	1	12.8	1.38