

Nutrition

Before studying sheep, it is important to understand the animal with which you are working. The sheep is a ruminant, which means it has more than one compartment in its stomach. This allows it to digest feeds that contain fiber, like hay. After digesting these feeds, they convert the nutrients into meat and wool.

The Digestive System

Feed starts being digested in the sheep's mouth. The lips, tongue, and teeth gather feed and break it down into smaller pieces that are easier for the animal to digest. Next is the esophagus, a long hollow tube that carries the feed from the mouth to the stomach.

The stomach is composed of four parts: the rumen, the reticulum, the omasum, and the abomasum. The rumen and reticulum are a big vat that stores, stirs, and partially digests feed. The feed stored here is regurgitated, moved back

up the esophagus to the mouth, and re-chewed. The bacteria that live in this compartment help break down the feed. The omasum grinds the feed and squeezes the water out of it. The abomasum is the "true stomach" and has digestive juices (acids and enzymes) that further break down feed into usable nutrients.

After the food leaves the stomach it goes into the small intestine. This is where most nutrients are absorbed. Much of the water in the food is absorbed in the next section of the digestive tract, the large intestine. The unused feed is then passed out the body through the anus. (See Figure 57.)

Nutrients

Nutrients are elements in feed that are used by the animal for growth and production. Some are needed in large amounts while others are needed in small amounts.

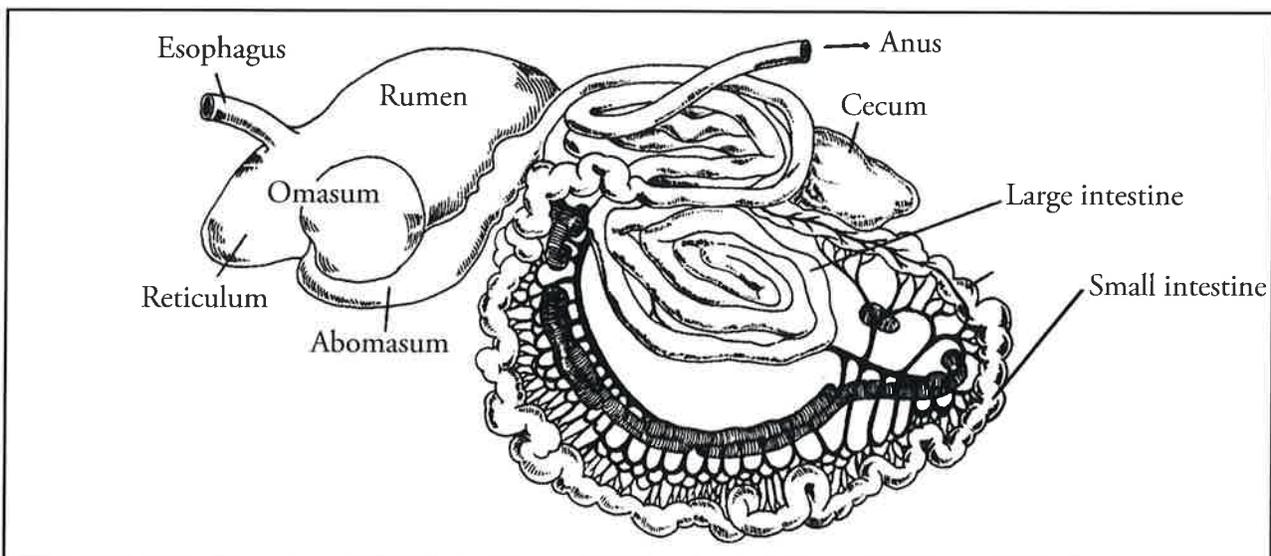


Figure 57
Essential Parts of a Ruminant Digestive System

In general, nutrients are divided into five categories: water, protein, carbohydrates, minerals, and vitamins.

Water is the main constituent of the body. Two-thirds of the body is water, thus, an animal can live much longer without feed than water. Water helps the body digest food and carries nutrients to body tissues. It also helps get rid of wastes and keeps the body temperature regulated. **Sheep should always have access to a supply of clean, fresh water.**

Proteins are the building blocks of the body. They are very complex chemicals, made up of amino acids that are used to build muscle, blood, internal organs, and skin. They also help form parts of the nervous system and the skeleton. Proteins can be used as energy, too. When feed contains too much protein, the extra protein is used as energy. Soybean oil meal and fish meal are high in protein. Corn and barley are lower in protein.

Carbohydrates and fats are used to supply energy. The main use of energy is to make chemical reactions, resulting in conversion of feed to meat. Energy nutrients that are not used are stored as fat until needed. Sugar, starch, and fiber are carbohydrates. Corn oil and tallow are fats. Fat furnishes two and one-fourth times more energy than equal amounts of carbohydrates.

Minerals are needed in small amounts and are used to build bones and teeth and in chemical reactions necessary for many life processes. Salt (NaCl) is a regulator in the body and sheep need 7–11 grams daily. Salt should only be fed in the loose form to ensure that sheep can eat enough. Calcium is essential for bone growth and maintenance. Legumes (alfalfa) are high in calcium. Calcium can be supplemented by adding limestone to the ration. Phosphorus is needed in bone growth also. Phosphorus deficiencies can be overcome by feeding dicalcium phosphate. Iodine is another important mineral and is best supplied by feeding. There are minor minerals that are important such as copper and selenium. Feeding a trace mineral salt will help avoid deficiencies or toxicities.

Vitamins are also needed in small amounts by the animal. All the necessary vitamins except A, D, and E are produced in the rumen of the mature sheep. Vitamin A is available from green feeds, such as hay, and stored in the liver for 3–4 months. Vitamin D is made available from the sun shining on the skin. Vitamin E and the mineral selenium are important for the prevention of white muscle disease. Selenium should be supplied in the diet in areas that are selenium deficient, like parts of Ohio. Vitamin E is important for maintaining the healthiness of body cells, and thus, is important for reproduction because it maintains the cells of the reproductive organs. Wheat germ meal, dehydrated alfalfa meal, and some green feeds are good sources of Vitamin E.

Classes of Feedstuffs

Feeds can be broken down into four basic categories: roughages, concentrates, protein supplements, and other feed stuffs.

Roughages are fibrous feedstuffs that are somewhat low in energy. Examples of these are alfalfa, hay, and corn silage.

Concentrates are high in energy or TDN and low in fiber. Corn, oats, and barley are examples of concentrates.

Protein supplements are feeds high in protein density and are used in diets to supply the additional protein required.

Other feedstuffs include water, nonprotein nitrogen (NPN), vitamin and mineral supplements. These nutrients are important but they do not fit in the other classes. NPN is used as a substitute for plant and animal protein because it is often a cheaper source of protein. Urea is the most common source of NPN fed. Urea concentrates should not exceed one-third of the total dietary protein or 1 percent of the total ration.

Classifying Feed Ingredients into Nutrient Groups

Energy (Carbohydrates & Fats)¹

Whole grain barley
Whole grain oats
Wheat
Wheat middlings*
Corn
Milo
Beet pulp
Hay and hay cubes*
Molasses
Whole-grain rye
Whole cottonseed*
Buckwheat
Soybean hulls
Dried whey

Proteins¹

Cottonseed meal
Soybean meal
Linseed meal
Corn gluten meal
Corn gluten feed*
Distillers grain
Brewers grain
Blood meal
Fish meal
Dehydrated alfalfa meal pellets*

Urea (is a non-protein nitrogen source that is used in small amounts for protein in ruminant diets).

¹A protein supplement is usually defined as a feed containing greater than or equal to 20% crude protein (dry matter basis). Some feeds for example, (those marked with an “*”) may be described as protein or energy because they are moderate in fat (energy) and protein or because their concentration of protein may vary to being less than or greater than 20% crude protein. Therefore, those feeds marked with an “*” are most commonly classified as listed above.

Minerals

Bone meal
Dicalcium phosphate
White salt
Trace-mineralized salt
Ground limestone

Vitamins

None of the feeds listed is a vitamin-only pre-mix.

Water

**The complete pelleted feed is not listed under a specific category because it contains carbohydrates, proteins, minerals, and vitamins.

Reference: “Feeds & Nutrition”, 1990, M. E. Ensminger, J. E. Oldfield, and W. W. Heinemann. Ensminger Publishing Company, Clovis CA.

Feed Identification

These are feedstuffs used throughout the livestock industries.

Those check marked are commonly used in sheep diets.

✓ Indicates This Feed is Used in Sheep Diets	Name of Feed	Color	Texture	Other Characteristics
✓	Whole-Grain Oats	Brown	Slightly rough with irregular edges	Common cereal grain fed for its fiber
✓	Cracked Corn	Yellow/White	Rough	Whole corn kernels that have been broken; starch may stick to fingers
✓	Soybean Meal	Light brown	Granular to flaky	By-product after removing oil from oilseeds; 44% crude protein (CP) soybean meal= soybean meal plus soybean hulls; 48% CP=soybean meal without hulls
✓	Complete Pelleted Feed	Light brown with yellow spots	Smooth	Tubular shaped particles that may be of varying length because of breakage of the pellets
✓	Dry Molasses	Dark brown	Flaky and/or Granular	Sweet smell; high in sugar; made from sugar beets (most common source) or sugar cane
✓	Whole Kernel Corn	Yellow	Smooth	Most common cereal grain in Ohio
✓	Steam-Rolled Oats	Light brown	Flaky	Whole oats that have been steamed and rolled; look for creases in the kernel caused by the roller
	Dried Whey	Light brown	Powdery	Smells sweet like milk replacer; by-product from making cheese
✓	Trace Mineral Salt	Bronze	Granular, grainy	Looks like tiny, uniform crystals
✓	Ground Lime-stone	Light gray	Granular	Looks like small rocks of various sizes
✓	Dried Sugar Beet Pulp	Grayish-brown	Rough	Looks like a dried root; by-product from removing sugar from beets
✓	Steam-Rolled Barley	Brown	Flaky	Whole barley that has been steamed and rolled; look for creases in the kernel caused by the roller; darker color and shorter in length than rolled oats

Feed Identification (continued)

✓ Indicates This Feed is Used in Sheep Diets	Name of Feed	Color	Texture	Other Characteristics
✓	Hay Cube	Green	Rough	Large cube with noticeable hay particles pressed together
✓	Wheat Middlings	Brown with white spots	Flaky	By-product from removing starch from wheat; looks like crumbled bran cereal
✓	White Salt	White	Granular, grainy	Looks like tiny, uniform crystals
✓	Fish Meal	Brown	Powdery	Smells like fish; look for tiny bone chips; by-product from fisheries or removal of oil from fish
	Distillers Grains	Brown	Flaky to powdery	Sweet smell; by-product from making alcohol for liquor or fuel
	Soybean Hulls	Light brown	Flaky	Look for dark specks from the outer coat of soybeans; by-products of removing oil from soybeans
	Corn Gluten Meal	Yellow	Granular to powdery	By-products from removing starch, oil, and germ from corn
	Blood Meal	Dark brown to dull red	Granular to powdery	By-products from meat industry
✓	Dehydrated Alfalfa Meal Pellets	Green	Smooth	Tubular shaped particles that may be of varying lengths because of breakage of the pellets
✓	Dicalcium Phosphate	Gray	Granular	Looks like small rocks of uniform sizes
✓	Urea	White	Granular	Small bead-like particles; used as a source of nonprotein nitrogen for ruminant animals
	Buckwheat	Brown to light black	Smooth with sharp edges	Grain grown in limited quantities
✓	Whole-Grain Wheat	Brown	Smooth with round edges	Look for crease along the middle of one side
	Corn Gluten Feed	Light brown	Flaky	By-product from removing starch, oil, germ, and gluten from corn
	Milo (Whole-Grain Sorghum)	Reddish-brown	Smooth	Round, bead-like grain

Feed Identification (continued)

✓ Indicates This Feed is Used in Sheep Diets	Name of Feed	Color	Texture	Other Characteristics
	Brewers Grain	Brown	Flaky	By-product from making beer from grains; particles more oblong than for soybean hulls
	Whole Cottonseed	White	Fuzzy	By-product from removing cotton lint from seeds
✓	Cottonseed Meal	Brown	Granular to powdery	By-product from removing oil from cottonseeds
	Whole-Grain Rye	Brownish-gray	Smooth with round edges	Particles are longer than for wheat
	Ground Corn	Yellow	Powdery	Whole corn ground very fine
✓	Linseed Meal	Varies from light to dark brown	Granular	By-product from removing oil from flaxseed; not commonly used in most areas of the U.S.
✓	Whole-Grain Barley	Brown	Slightly rough with irregular	Particles are shorter than for oats edges

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Glossary

Average Daily Gain—The amount of weight gained each day.

$$\text{ADG} = \frac{\text{Present weight} - \text{previous weight}}{\text{Number of days between weights}}$$

Balanced ration—A ration containing nutrients in the correct proportion to nourish the animal properly for 24 hours.

Concentrate—A feed high in energy and low in fiber.

Crude protein (CP)—A measurement of the amount of protein in a feedstuff or the amount of protein the animal needs.

Diet—The required amount and proportion of nutrients for an animal. A diet is a formulated set of nutrients that is based on the animal's requirements.

Digestion—The changes in a feed that must take place before the nutrients can be absorbed and used by the animal.

Nonprotein nitrogen (NPN)—Feed ingredient that is not a protein but which contains nitrogen (an example is urea)

Protein supplement—A feed that contains a high density of protein and is used to supply additional protein in the ration.

Nutrient—A substance that an animal needs for support of life or growth.

Ration—The amount of feed given to an animal in a 24-hour period.

Roughage—A feed high in fiber and somewhat low in energy.

Total digestible nutrients (TDN)—A measure of energy in a feed or of how much energy an animal requires.

The Ration

Feedstuffs contain different amounts of the nutrients. That is why mixtures of feedstuffs are fed to lambs. Mixing feedstuffs to get the right amount of the nutrients that the lamb needs is called balancing the ration. A balanced ration is one that will furnish the nutrients in the proportion needed to nourish the animal properly for 24 hours.

Probably the most important decision of your lamb project will be what and how to feed your lambs. No matter how good a lamb you start your project with, if it is not on a well-balanced nutritional program from birth to market, it will not develop at its best. While many of you in this project will not be raising a lamb from birth, it is still important that you know the full range of a lamb's nutritional needs.

Creep Rations

If you are raising lambs from your own flock, you will want to start your lambs on a creep ration when they are 5–12 days old. The sooner you start lambs on dry feed, the more rapidly their digestive system develops. Also, the younger the lamb, the more efficient it is at turning feed into muscle and bone.

To ensure that young lambs get all the feed they need, you should provide a creep feeder for them from the time they are one week old until they are weaned (usually 6–8 weeks of age). Feed a high quality creep ration that is high in protein

(18–21 percent). You will probably want to feed a commercial ration that comes in both a pelleted and crumble form.

Allow your lambs to have access to the creep ration until you have weaned them from the ewes. Then it would be a good idea to continue this ration for 4–7 days after weaning to avoid digestive disturbances and to keep the young lambs eating normally.

Growing and Finishing Rations

If you purchased lambs through a lamb sale or from another sheep producer, ask what he or she has been feeding the lamb up until that time. If the lambs have been on complete creep or grain ration, try to obtain a similar ration and follow this feeding program. If you make adjustments or changes to the ration, do so over a 2–4-day period to allow the lamb's digestive systems to adapt.

Some lambs you purchase may not have eaten any grain. If this is the case, you will need to start them slowly on such a ration. For 50–60 pound lambs, start them on $\frac{1}{2}$ pound of the grain ration and gradually build them up to higher feedings or to self-feed.

As lambs reach 50–60 pounds, their requirements for protein are not as great. Complete pelleted “growing” rations that range from 12–16 percent protein are adequate and available through commercial feed companies. This type of ration can be fed until you market them.

Make sure that the lamb is gaining weight, weigh at least once a month if possible so that you will know how the lamb is performing. Adjust feed to rate of gain and number of days until the fair. Exercise the lamb at least once daily, but adjust feed to the amount of exercise the lamb gets. If you walk your lamb 5 miles per day, it will need more feed than if it is walking 200 yards per day.

If you would like to mix your own rations to feed with homegrown feedstuffs, here are ingredients for two different types of rations:

Ration #1

60 lbs. shelled corn (or cracked corn)
75 lbs. oats
20 lbs. commercial sheep supplement
@ 35 percent protein
10 lbs. bran
3 lbs. sheep salt
7½ lbs. molasses

Ration #2

85 lbs. oats
35 lbs. shelled corn (or cracked corn)
15 lbs. commercial sheep supplement
@ 35 percent protein
8 lbs. bran
3 lbs. sheep salt
7½ lbs. molasses

Feeding Sheep

Many things influence an animal's feed requirements: climate, age, sex, body size, exercise and stage of production, which include growth, lactation, gestation and maintenance. (See Table 3.)

During gestation and lactation, energy is the most common limiting nutrient for ewes. Supplemental energy must be supplied at this time, to keep the ewe at peak milk production.

Lambs

A lamb less than 2 weeks old depends mainly on its mother's milk. But it should be introduced to creep feed so it will begin to nibble on the grain and hay.

Lambs 2–4 weeks old eat some grain and hay with their mothers' milk. The creep ration should be of high quality and high in protein 18–21 percent. The lambs should have free access to the creep ration and high quality hay until a week after weaning.

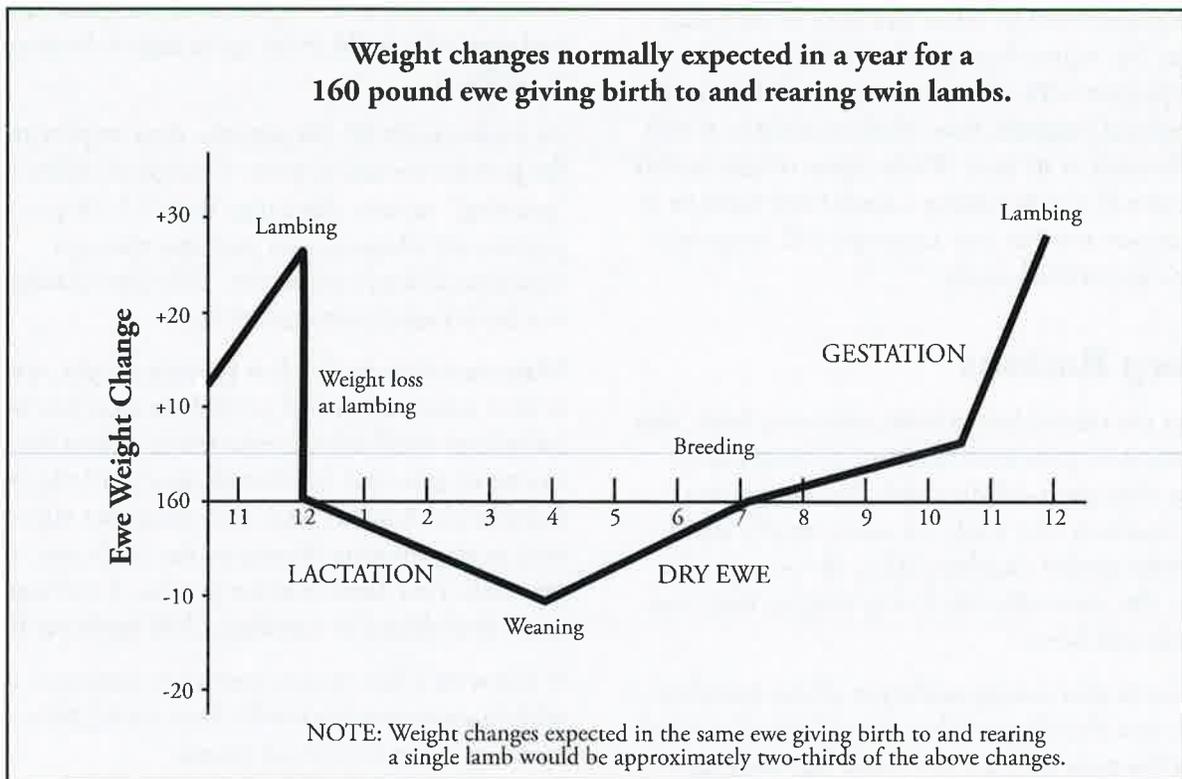


Table 3

Information from SID Sheep Production Handbook

Lambs are usually weaned at 6–8 weeks of age. Give them an adjustment period of about a week and then slowly change their diet to a “growing” ration. This ration contains 14–16 percent protein.

Growing Replacements

Growing ewe and ram lambs need adequate protein and energy. Their diet should contain 9–14 percent crude protein. When feeding replacements, be sure not to over feed them and get them too fat. Over-fat animals have a lower reproductive rate.

Maintenance Diet for Mature Rams and Open Ewes

This type of ration should contain about 9 percent crude protein and during the summer months may easily be supplied by good quality pasture. While on pasture the animals should have salt and minerals available free choice.

Flushing

Flushing is the practice of encouraging thin ewes to gain weight and improve body condition just before the breeding season. This is done to increase the ovulation rate. It can be accomplished by feeding $\frac{1}{2}$ pound of shelled corn or by turning the ewe out on a lush pasture. Flushing should be done 2–5 weeks before the breeding season, depending on the animal’s body condition.

Rams may need 1–2 pounds of 9 percent protein feed, in addition to pasture, during the breeding season.

Pregnant Ewes

Early Gestation

During early pregnancy, a 9–11 percent protein ration is adequate as long as the ewe has proper vitamins and minerals. The vitamins can be supplied by sun-cured hay. The minerals should be available from a trace mineral salt provided free choice.

The Last 6 Weeks of Pregnancy

During the last 6 weeks, the lamb(s) gain about three-fourths of their birthweight, so the rapidly-growing lambs greatly increase the ewe’s energy needs. The ewe’s ration must now be higher in energy. This may be done by adding $\frac{1}{2}$ –1 pound of shelled corn.

Lactating Ewes

During lactation, the ration should contain 13–16 percent crude protein and more energy depending on the number of nursing lambs. This is the most crucial time to meet the ewe’s energy requirements. The nutrients the ewe needs are for her lamb(s) as well as herself.

Careful observation is the key to feeding sheep correctly. Because not all sheep are the same and many factors affect their requirements, continuously monitor each animal’s body condition. Make sure they are not losing or gaining too much weight.

Comparing Prices of Protein

1. Multiply	the percent of protein x 2,000 pounds=pounds of protein in one ton.	
2. Divide	the price per ton by the pounds of protein per ton=price per pound of protein.	
Example:	Soybean Meal 44 percent protein \$248.40 per ton	Fish Meal 61 percent protein \$530 per ton
1. Multiply	Soybean .44 x 2,000=880 pounds	Fish Meal .61 x 2,000=1,220 pounds
2. Divide	Soybean Meal \$248.40 ÷ 880=\$0.28/ per pound	Fish Meal \$530 ÷ 1220=\$0.43/pound
In this example, soybean meal is a cheaper source of protein.		

Balancing Rations

A balanced ration is one that will furnish the nutrients in the proportion needed to nourish the animal properly for 24 hours. The way to balance a ration is to list the requirements of the animal and try to find the kinds and amounts of feeds needed to meet those needs.

Nutrient Content of Feed “As Fed” compared to “Dry Matter” Basis (DMB)

Feedstuffs contain water in varying amounts and this must be considered when determining how much of a feedstuff your animal should be fed. For example, corn silage contains 35% dry matter (65% water, as fed), whereas corn grain contains 86% dry matter (14% water, as fed). For your animal to meet its energy requirements, it will have to consume a much larger volume of the corn silage than corn grain to get the same amount of energy from the feed. Keep in mind that the size and production stage of your animal will need to be considered as well in determining

the type of feedstuff your animal will be able to consume to meet its requirements for maintenance, growth and production. A young lamb will eat up to 6% of its body weight in dry matter, whereas a mature animal will consume up to 3% and a lactating animal up to 5% of its body weight in dry matter. However, the capacity (room) each of these animals has in their stomach will change the total volume they are able to consume. A small lamb or pregnant ewe, for example, doesn't have as much capacity and will therefore not be able to eat as much feed. As a result, they will need to eat a feedstuff that has a higher percent dry matter. The more water in a feed (meaning the lower the percent dry matter), the less nutrients in the feed (per pound) and the larger amount the animal needs to consume to meet its nutrient requirements.

Helps in Balancing Diets and Rations

1. Corrections for moisture
 - A. Some guidelines
 1. The percentage of a nutrient in a feed on a dry basis will always be higher than it will be on a wet basis.
 2. The amount of dry matter consumed or required is always less than the amount of feed consumed or required.
 3. Whenever a nutrient is expressed in units such as lbs., grams, or calories, the units are not changed by moisture corrections.
 4. Wet basis is also called as-fed, sample basis, as is, or fresh basis.
 5. Many feed tables and requirement tables assume a universal 90% dry matter content for feed and feed ingredients. While this is generally

true, it is necessary to question each ingredient, especially if silage, molasses, high moisture grain or other feeds with high water content are being used.

6. ALWAYS be sure of the moisture basis of your data before you begin.

Converting feed (as-fed) to feed dry matter

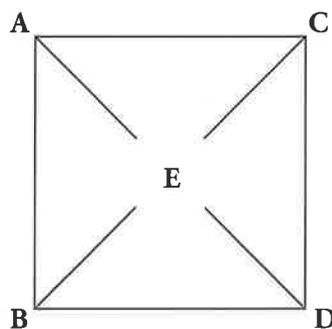
$$\text{lbs. Feed dry matter} = \frac{\text{lbs. Feed} \times \% \text{ dry matter}}{100}$$

Methods of determining mixtures with a given composition.

- A. The square method.

This is used to determine how much of two ingredients have to be mixed together to give the desired concentration of a given nutrient. It is perhaps your most useful tool.

1. Draw a square.
2. Place at E the concentration of the nutrient you want. (For example, 15% protein)
3. Place at A and B the concentration of the nutrient in the feeds you are using. (For example, corn = 10% protein, soybean meal = 50% protein)
4. Subtract diagonally (B - E = C and A - E = D) and disregard the sign of the result.

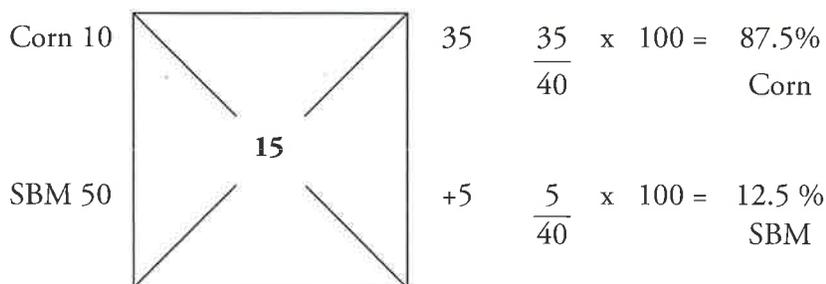


5. C is now the number of parts of feed A and D is the number of parts of feed B. (Do not be confused by the fact that C was derived from B and D was derived from A. Have faith and it will work out.)

6. Add C + D and then determine the percentages of C and D by the formula

$$\frac{C}{C + D} \times 100 = \% C$$

$$\frac{D}{C + D} \times 100 = \% D$$



Check Your Answer!

$$87.5 \times .10 = 8.75$$

$$12.5 \times .50 = 6.25$$

15.00% Crude Protein

Exercise #1

Calculate a balanced ration utilizing the following feedstuffs.

- | | |
|----------------------------------|--------------------|
| 1. Shelled Corn | 9.0% Crude Protein |
| 2. Commercial Protein Supplement | 37% Crude Protein |

Calculate this ration as a 16% crude protein ration. This will only be the concentrate part of the total ration. Minerals and vitamins should be provided on a free choice basis.

Exercise #2

Calculate a balanced ration utilizing the following feedstuffs.

- | | |
|---------------------|---------------------|
| 1. Shelled Corn | 9.0% Crude Protein |
| 2. Oats | 12% Crude Protein |
| 3. Soybean Oil Meal | 44.0% Crude Protein |

Calculate this ration as a 14% crude protein ration. This will only be the concentrate part of the total ration. Minerals and vitamins should be provided on a free choice basis.

****Key-**With more than 2 feedstuffs available, you will need to set two of the feedstuffs and then calculate the third feedstuff and the other feedstuffs together. For example, grain equals 50% shelled corn and 50% oats, therefore the CP of the grain component is 10.5%.

Ewe Rations Appropriate at Various Stages of Production (Amounts to Feed Each Ewe Daily)^a

Stage of Production	Ration No.	Alfalfa Hay Midbloom	Corn Silage Mature	Corn Alfalfa Haylage	Wheat Straw	Corn Stover Mature	Corn Grain Dent	Soybean Meal 44% CP
		Lb	Lb	Lb	Lb	Lb	Lb	Lb
Maintenance	1	3.0	—	—	—	—	—	—
	2	—	6.0	—	—	—	—	0.20
	3	—	—	6.0	—	—	—	—
	4	—	—	—	3.00	—	—	0.40
Gestation (first 15 weeks)	1	3.5	—	—	—	—	—	—
	2	—	6.00	—	—	—	—	0.25
	3	—	—	5.0	—	—	0.50	—
	4	1.00	—	—	—	2.00	0.50	—
	5	—	—	—	—	2.50	0.50	0.40
Gestation (last 4–6 weeks) 130-150% lambing rate Expected	1	3.50	—	—	—	—	0.75	—
	2	—	6.00	—	—	—	0.75	0.40
	3	—	—	7.00	—	—	0.75	—
	4	1.75	—	—	—	2.00	0.75	—
	5	—	—	—	—	3.00	0.75	0.60
Gestation (last 4–6 weeks) 180-225% lambing rate Expected	1	3.50	—	—	—	—	1.25	—
	2	—	7.00	—	—	—	1.00	0.50
	3	—	—	7.0	—	—	1.25	—
	4	2.00	—	—	—	2.00	1.00	—
	5	—	—	—	—	3.00	1.25	0.60
Lactation (first 6–8 weeks Suckling singles)	1	4.00	—	—	—	—	2.00	—
	2	—	9.00	—	—	—	1.00	0.85
	3	1.00	7.00	—	—	—	1.00	0.65
	4	—	—	8.00	—	—	2.00	—
Lactation (first 6–8 weeks Suckling twins)	1	5.00	—	—	—	—	2.00	—
	2	—	10.00	—	—	—	1.00	1.25
	3	1.00	8.00	—	—	—	1.10	1.00
	4	—	—	8.00	—	—	2.25	0.25

^a These rations were formulated to meet the requirements of a 154 lb. Ewe in average body condition. Depending on actual size of the ewe and body condition score, the amounts fed can be adjusted.

Feeding Directions:

1. These rations are designed to be hand-fed at least once daily. The amounts given are required per ewe daily.
2. During maintenance and the first 15 weeks of gestation each ewe should have 14-inch bulk feed space. In late gestation (last 4 weeks) and during lactation bunk space should be increased to 16–18 inches.
3. Some of these rations are deficient in calcium and/or phosphorus; therefore a supplement containing 50 percent trace mineral salt (for sheep) and 50 percent dicalcium phosphate should be fed free choice. The consumption of 0.05 lb. per sheep per day of this mixture would provide the amounts of calcium and phosphorus needed for maintenance and the first 15 weeks of gestation; 0.10 pound/day would provide that needed for late gestation and lactation. Vitamins A and E should be added to the salt-mineral mix when sheep are fed the wheat straw and corn stover rations.
4. Ohio State University researchers have added 20 pounds urea, 10 pounds limestone and 4 pounds dicalcium phosphate to a ton of corn silage at time of ensiling or at feeding time. They found this provided adequate nutrition for the gestating ewe. Their recent research indicates the addition of 5 pounds of sodium sulfate would be particularly beneficial.

Chart from SiD Sheep Production Handbook.

Complete Diets for Gestation and Lactation

Ingredient	Gestation Diets				Lactation Diets			
	1	2 (lb./ton)	3	4	1	2 (lb./ton)	3	4
Corn grain (dent yellow)	400	—	—	150	575	—	—	300
Alfalfa (mature)	1430	—	1280	—	1185	—	1000	—
Corn silage (mature)	—	1927	—	—	—	1845	—	—
Corn & Cob meal	—	—	600	—	—	—	730	—
Alfalfa haylage	—	—	—	1850	—	—	—	1700
Soybean meal (solvent 44% CP)	—	60	—	—	125	135	150	—
Molasses (cane)	150	—	100	—	1000	—	100	—
Calcium carbonate	—	8	—	—	—	10	—	—
Dicalcium phosphate	10	5	10	—	10	10	10	—
NUTRITIONAL CONTENT %								
Dry matter	87.2	38.0	87.2	48.2	87.5	40.2	87.2	51.4
TDN								
As fed	51.8	26.5	52.4	30.1	56.6	28.3	56.5	34.2
DM basis	59.4	69.8	60.1	62.5	64.7	70.4	64.8	66.5
CRUDE PROTEIN								
As fed	10.2	4.1	9.8	7.7	12.2	5.7	12.1	7.8
DM basis	11.7	10.8	11.3	16.0	14.0	14.1	13.9	15.2
CALCIUM								
As fed	0.92	0.24	0.84	0.63	0.74	0.28	0.72	0.58
DM basis	1.06	0.64	0.96	1.30	0.84	0.71	0.82	1.12
PHOSPHORUS								
As fed	0.26	0.10	0.27	0.13	0.26	0.12	0.30	0.14
DM basis	0.30	0.25	0.31	0.28	0.30	0.29	0.35	0.28
Chart from SiD Sheep Production Handbook. Ration Worksheet								

Nutrient Contents of Common Feedstuffs

Description	DM %	CP %	TDN %
Roughages			
Alfalfa Hay	90	15.3	51
Red Clover Hay	88	16.0	55
Timothy Hay	89	8.1	53
Orchardgrass Hay	89	13.4	47
Corn Silage	33	2.7	23
Brome Grass Hay	91	8.8	49
Fescue Hay	92	16.7	55
Ladino Clover Hay	90	19.7	59
Birdsfoot Trefoil Hay	92	16.3	58
Kentucky Blue Grass Hay	92	9.6	55
Concentrates			
Corn (Shelled)	88	8.9	77
Barley	88	11.9	77
Wheat	89	14.2	78
Oats	89	11.8	68
Soybean Oil Meal	90	44.8	79
Fish Meal	92	61.1	64
Corn Distillers Grain	92	23.0	80
Linseed Meal	91	34.0	75

Table 5

There are many different formulations of feed which can be used efficiently. Try to use the least expensive possible. This will provide you with more profit in the end. Many lambs are fed pelleted feeds throughout the project. Pelleted feeds are more expensive, but you are assured that they are balanced for all nutrients. More expensive, specialty feeds are also available in many areas. It depends on your goals and if you feel you can afford these feed materials and reduce your profits from your project.

If you are using medicated feeds, make sure you check to see if there is any withdrawal time on the medication used.

Feed Tags

All commercial type feed that you purchase will have a feed tag attached to the bag. A feed tag is like the Nutrition Facts label on a cereal box. It lists the ingredients in the feed. The ingredients listed are in descending order of the percent makeup of the feed. The sample feed tag shown below contains grain products as the major ingredient.

Net Weight 50 Pounds

GRO-MOR

16% Lamb Finisher B

Medicated
For the prevention of coccidiosis caused by Eimeria ovina. E. crandallis. E. ovinoidalis. E. ninakohlyakimovae. E. parva. and E. intricata.

Active Drug Ingredient

Lasalocid 30 gm/ton

Guaranteed Analysis

Crude Protein Min. 16.00%
(Includes not more than 1.0% Crude protein equivalent from nonprotein nitrogen)

Crude Fat Min. 2.50%

Crude Fiber Max. 4.75%

Calcium Min. 0.40% Max. 0.50%

Phosphorus Min. 0.60%

Salt Min. 0.40% Max. 0.60%

Ingredients

Grain Products, Animal Protein Products, Plant Protein Products, Dicalcium Phosphate, Calcium Carbonate, Salt, Potassium Chloride, Magnesium Oxide, Vitamin A Acetate in Gelatin, D-Activated Animal Sterol (Source of Vitamin D3), Vitamin E Supplement, Menadione Dimethylprimidol Bisulfite (Source of Vitamin K), Riboflavin Supplement, D-Calcium Pantothenate, Niacin, Vitamin B12 Supplement, Choline Chloride, Zinc Oxide, Ethylene Diamine Dihydrodiode, Cobalt Carbonate, and Sodium Selenite.

Caution

The safety of Lasalocid in unapproved species and breeding animals has not been established. Do not allow horses or other equines access to Lasalocid as ingestion may be fatal. Feeding undiluted or mixing errors resulting in excessive concentrations of Lasalocid could be fatal to sheep.

Feeding Directions

Feed as the sole ration to lambs from 80 pounds body weight to market. Feed continuously to provide not less than 15 mg. nor more 75 mg. of Lasalocid per head per day depending on body weight. Provide plenty of clean fresh water.

Manufactured by: XYZ Feed Company
Sheep Division
Anytown, USA 12345

16% LAMB FINISHER B

Sample Feed Tag

In the guaranteed analysis, certain nutrients such as protein, carbohydrates, vitamins, and minerals will be expressed in percentages and units per pound. On the sample feed tag, crude protein is a minimum of 16 percent and crude fat is a minimum of 2.5 percent, while Phosphorus is a minimum of 0.60 percent. The feed tag will also list any active drugs that are being used in the feed for medication and, if applicable, will list a withdrawal time for the active drug ingredient.

The feed tag will include the manufacturer of the product as well as feeding directions. You will want to study the feed tags of the feeds you purchase to make sure that they are meeting the nutritional requirements of your lamb.

Feed tags provide us important information about the nutrients and ingredients so we can match the feed to the animal's needs and the performance we expect. Anyone selling feed commercially must supply a label or tag with each bag or bulk shipment of feed. The information on the tag helps the person buying and using the feed know that it is appropriate for his/her animals. You should always read the tag to make sure that you are getting what you want in the product and that you are not getting something that you don't want, such as a long withdrawal time or an ingredient that is toxic to your animal. Unless you can understand what is written on these tags, you may not be providing your animals with the proper products.

Livestock feeds can be classed as either complete feeds or supplements. Complete feeds are those products that contain all of the nutrients that are required by your animal. You open the bag and dump the contents directly into the feeder. Supplements are products that are added or mixed into the feed supply with things such as protein, vitamins, minerals, and other ingredients that may be lacking in the base feed. Supplements are usually added in small specified amounts and are not to be fed as the total ration.

The law requires that feed manufacturers provide the following labeling information on every bag or package of product:

1. Product name and brand name if any. (GRO-MOR)
2. If a drug is used in the product, the word "MEDICATED" must appear below the product name with a purpose statement and purpose of medication (claim statement), followed by a listing of the active drug ingredients and the amount of drug in the product. (Lasalocid-30 gm/ton. For prevention of coccidiosis). Some feeds that are medicated or contain an active drug ingredient may or may not require a precautionary (or withdrawal time) statement.
3. Purpose statement specifying the species and animal classes for which the feed is intended. (market lambs, feeder lambs and lactating ewes, etc.)
4. Guaranteed analysis of the product. This will include:
 - a. Minimum percentage of crude protein
 - b. Minimum percentage of crude fat
 - c. Maximum percentage of crude fiber
 - d. Minimum and maximum percentage of calcium
 - e. Minimum percentage of phosphorus
 - f. Minimum and maximum percentage of salt
 - g. Minimum Vitamin A in International Units (IU) per pound

Depending on the product and/or species, additional guarantees may be included for various trace minerals, vitamins and specialty ingredients or nutrients.

5. The list of the ingredients, starting with the ingredient present in the highest concentration and listing in order of decreasing concentration to the last item that has the smallest inclusion. Actual ingredients, such as corn, wheat, soybean meal, etc. may be listed, or collective terms may be used. Collective terms which may be used may include "Grain Products" which allow any or all grains to be used in the feed product, or "Plant Protein Products" which allows inclusion of any or all of the protein

ingredients like soybean meal, cottonseed meal, etc. Collective terms denote a general classification of ingredient origin which performs a similar function, but do not imply equivalent nutritional values.

The list of ingredients can be very enlightening. For example, if the product is supposed to be a high-quality protein supplement and the first item on the list is “Processed Grain By-Products”, the product may contain high levels of low cost, inferior carrier.

6. Directions for Use. Each product tag should provide information on how the product is to be used. Warnings or precautionary statements should be included. For example, any product containing monensin must carry the warning that it should not be fed to horses. Ingestion of monensin by equines has been fatal.
7. The name and mailing address of the company responsible for making or distributing the feed. (XYZ Feed Company Sheep Division, Anytown, USA 12345)
8. Net Weight Statement. This may be listed in pounds or kilograms. Many companies are listing net weights in the metric system. A kilogram is equal to 2.2 pounds, thus a 50 pound bag may be listed as 22.6 kg (kilograms). (Net weight: 50 lbs.)

Read the tags on the products you intend to use and fully understand what you are doing before you start using a product. Many potential problems can be avoided if you make sure that you are getting a suitable product and are feeding the correct amount to your livestock. Make sure that withdrawal times are noted and that they will not prevent you from showing or selling your animal as planned.

What about Hay?

For proper digestion, a sheep must have a certain amount of roughage in its ration. Hay should be fed in adequate amounts each day to keep the rumen of the lamb functioning properly. Breeding ewes will need more hay than market lambs. Roughage should be high in quality and fine-stemmed. Good quality roughages are those that are cut early. Feed a good quality legume hay (alfalfa). Green grass is not always a good idea because it contains too much water and does not provide enough fiber to the lamb. Additionally, many believe that a ground, pelleted form of hay in a complete ration or feed is enough. The addition of long stem (not ground) forage improves stimulation of the rumen even more through an event commonly referred to as scratch factor. This helps ruminal health and maximizes buffering capacity, reducing acid in the rumen. In other words, a certain amount of long stem forage is necessary at each feeding, regardless of the stage of production.

Depending upon the stage of production of the ewe flock, different amounts and qualities of hay can be fed. Ewe flocks on a maintenance diet can be fed a poorer quality hay than in late gestation.

Health Maintenance and Diseases

Health Practices

When purchasing brood ewes, rams and other animals for your 4-H project, health is a major consideration. Buy from a breeder who has a reputation for selling healthy breeding stock. Insist on a health certificate, signed by a veterinarian who has examined the flock of origin. Avoid bargains, especially if the animal looks thin.

Never mix new arrivals with your flock for at least 30 days. Immediately isolate any individual showing signs of disease.

Trim the feet of every animal as they are unloaded and look for signs of foot rot. Don't wait, as this may bring foot rot into the herd. Stand the sheep in a 10 percent zinc sulfate solution (8 pounds diluted in 10 gallons of water) for a minimum of 10 minutes after trimming. Do this before any newly purchased sheep go into the 30-day holding pen. Re-examine the feet of the sheep before they are turned out with the rest of the flock.

Care for Newly Purchased Sheep

Sheep that have been hauled some distance need to be handled quietly while they get over the stress of moving, new surroundings and a change of feed. Haul sheep in a draft-free vehicle.

Water

Clear, clean water, provided fresh daily and free from urine and manure, is important for health. When sheep first arrive, allow them to eat first. Provide water two or three hours later. Always

relate water temperature to the season. For instance, in winter, provide warm water. In summer, you should give them cool water.

Feed

Feeding facilities should be planned to prevent contamination and allow for frequent cleaning. Troughs should be high enough that the sheep cannot stand in them and contaminate them with urine and manure.

Good feeding and care will help prevent health problems in a flock. Watch the lambs (adult sheep, too) closely to spot problems early, before the animal gets too sick. A normal, healthy sheep will hold up its head when approached, will appear alert and bright-eyed and its breathing will not be labored or rapid. A sheep's temperature will be about 102.3°F, it will resist being caught or confined, and it will have a normal-sized stomach-not hollow or bloated. Any changes may mean the sheep is sick. As soon as disease or sickness is detected:

1. Isolate the sick animal immediately in a clean, dry pen.
2. Get an accurate diagnosis of the problem from a veterinarian.
3. Follow the veterinarian's recommendations.

Common Health Problems

There are several common diseases and health problems in sheep. The conditions mentioned here are only a few of the possible problems that might be encountered. Consult your veterinarian any time there is a health problem. Be prepared to tell him or her how sick the animal is, different from a healthy animal. Veterinarians can help you and your animal if you take advantage of their resources.

Special Note: Only those medications specifically recommended or approved for sheep should be used unless they are otherwise prescribed by a veterinarian.

Enterotoxemia is commonly known as “overeating” disease. It is a common cause of death in lambs but may occur at any age. The disease can strike a lamb if it is weaned suddenly, its feed is changed too rapidly, or it is fed irregularly. The animal may appear to be in a coma with its head held back. Death usually occurs suddenly. Treatment usually doesn’t help. It can be prevented by vaccinating the lambs 10–14 days before weaning with *Clostridium Perfringens* Type D Toxoid followed by a booster dose 3 weeks later. Also, maintain a good feeding program.

External parasites (lice, ticks, and mange) may be treated with various liquid sprays or powders. Sprays that wet the animal to the skin are the most effective. Shearing makes the application of sprays, pour on medications, and powders easier and more effective. Wear rubber gloves and protective clothing when treating sheep with these insecticides. They can be absorbed through the skin and cause illness. Consult a veterinarian for product suggestions.

Foot rot is a highly infectious disease caused by two different bacteria that infect the foot. The disease usually starts between the toes of the foot with swelling and moistness of the skin. There is also a slight lameness that increases as the bacteria spread. Sheep seldom die of foot rot, but the loss of weight and your labor treating foot rot make it very costly.

If you remove manure from between the toes of an animal with foot rot, you will notice a distinct odor. Treatment of foot rot requires weekly examination and trimming of the feet of all sheep in the group. The sheep should then stand in a solution of zinc sulfate (8 pounds in 10 gallons of water) for a minimum of 10 minutes. This should continue until all sheep are healed and none are limping.

Internal parasites (stomach and intestinal worms) in sheep are a common problem. Noticeable symptoms of parasites include poor weight gain, depression, listlessness, broken wool,

and whiteness (anemia) around the eyes and gums. In advanced stages, a large swelling forms under the jaw, sometimes called “bottle jaw”.

Many dewormers are sold on the market. Some common ones are Tramisol and Ivermectin. Follow the label directions for the proper amount of dewormer for your sheep. Consult a veterinarian for product suggestions.

Planning an internal parasite control program requires consideration of the ages of the animal, whether they are on grass pasture or in a dry lot, previous de-worming history, and the season. Consult other Extension publications and your veterinarian in planning a control program.

Coccidiosis, a parasite different from the common stomach and intestinal worms, sometimes affects lambs. A sign of this parasite is watery, dark diarrhea, often containing some blood. Since this is similar to that of other diseases, it may be necessary to have a veterinarian make a diagnosis and prescribe treatment. There are drugs and feed additives, known as coccidiostats, that can be added to the feed or water to help control this disease.

Pregnancy toxemia, also known as lambing sickness, pregnancy disease, or ketosis, is highly fatal in ewes. It usually occurs during the last month of pregnancy and is caused by the ewe not having enough energy to meet both her nutritional needs and the needs of her lamb. Instead, most of her energy goes to the lamb, causing the ewe to have hypoglycemia or “low blood sugar”. A ewe will stand apart from the others in a flock, walk unsteadily and appear to be going blind. To prevent this, you may need to add shelled corn or other high energy concentrates to the diet about 30–45 days before lambing. The amount of the feed will depend on the ewe’s body condition and the energy level of the forages.

Ewes with pregnancy diseases are often treated with propylene glycol orally, but a caesarian section and other treatments are sometimes necessary. The disease may be prevented by making sure that the ewe receives enough energy in her diet during late gestation.

Mastitis is an inflammation of the udder, or mammary gland. It is usually caused by a

bacterial infection. It may develop over just a few hours and may be severe (acute mastitis), or it may develop slowly and not be noticeable (chronic mastitis). In acute mastitis, the udder becomes hard, painful, reddened, and swollen. The ewe may not let the lambs nurse, and she may not want to eat feed. The milk may be brown, or yellow, and watery with clumps. These ewes require antibiotics and supportive treatment. Acute mastitis sometimes progresses to gangrene, sometimes referred to as “blue bag”. It is wise to call your veterinarian at the first signs of acute mastitis.

In chronic mastitis, the udder is inflamed, but to a lesser degree than in acute mastitis. It often goes unnoticed but may reduce milk production. If the infection occurs during the dry period, the milk secreting tissues may become so damaged that the ewe has little or no milk in half, or all, of the udder at lambing. Mastitis during the dry period may be reduced by removing all grain 3–5 days before weaning and putting the ewes on a low quality hay diet. This helps reduce congestion in the udder by reducing milk production.

A condition called “hard bag” may sometimes be confused with mastitis caused by bacteria. Hard bag is caused by the virus associated with the disease called Ovine Progressive Pneumonia (OPP). This virus may cause chronic lung damage leading to severe weight loss and poor stamina. The virus also causes arthritis often seen in the knees, and rarely, may cause brain degeneration leading to paralysis. Ewes with “hard bag” are usually not sick, but the udder may be uniformly firm and have little to no milk. The udder is not hot or painful. There is no treatment. This disease is usually a flock problem, and the veterinarian should be consulted to assist in developing a plan to control this disease. The udder and milk flow should always be checked at lambing time to make sure that the lamb has enough milk.

Pneumonia is usually caused by a combination of viruses and bacteria and can affect sheep of all ages. It is most common in the first 30 days of life and in feeder lambs. Cold stress, shipping, weaning, transportation, high humidity, poor ventilation, and the presence of carrier animals shedding certain bacteria and viruses may increase the incidence of pneumonia in a group of

sheep. Prevention should be directed toward eliminating the conditions that encourage the development of pneumonia.

Navel ill is caused by bacterial infection of the navel cord stump. The navel may be swollen and painful, and it may develop an abscess next to the belly. Infection may also travel up the stump and result in infection in the lamb’s joints. This condition is usually seen in the first 2–3 weeks after birth and can be prevented by using clean lambing areas and applying iodine to the navel stump for 2–3 days after birth.

Sore mouth or contagious ecthyma can infect sheep of any age. The disease is caused by a virus and can be recognized as small red spots at the corners of the lips. The spots soon develop into blisters and later turn into scabs. Eating is very painful for lambs with sore mouth, so they often lose weight. There is really no good treatment for the disease once it is contracted, but it goes away in 3–4 weeks. Vaccination can be done if the disease is a flock problem.

A word of caution: sore mouth can cause a fever and boil-like lesions on the skin of humans. The disease is called “orf”. Be cautious: wear gloves and protective clothing when handling lambs that have sore mouth or when vaccinating for sore mouth.

Stiff-lamb or white-muscle disease is caused by a lack of vitamin E and selenium. It can be prevented by making sure the diet of ewes and lambs contains adequate selenium. It may also be prevented by injecting all lambs with vitamin E and selenium shortly after birth. Affected lambs become stiff and cannot walk or nurse properly and die of starvation. Treating affected animals with vitamin E and selenium injections may result in recovery.

Tetanus is a fatal disease affecting lambs that have been docked or castrated, especially with elastrator bands. If tetanus is present on the premises, vaccinate all lambs with tetanus antitoxin when these operations are done.

Urinary calculi in sheep is widespread. Rams and wethers on high concentrate rations are most often affected, but the condition can occur in sheep being grazed on pastures or grain stubble.

Rations high in phosphorous content or rations with a calcium-phosphorus imbalance are often associated with urinary calculi. Salts normally excreted in the urine collect and form calculi (stones) that may lodge in the pelvis of the kidney, in ureters, the bladder or the urethra.

Affected animals stand with their backs arched and strain to pass urine. The animal may kick at the belly, prefer to lie down, and appear dull and uninterested in feed or water. In severe cases of urinary calculi, watery swelling (edema) of the lower abdomen may develop.

Prevention of this disease by management is essential, as treatment is often ineffective. A clean, constant source of water should be available. It is highly recommended that analysis be made of the feed to balance the calcium phosphorus ratio. In high grain diets, ammonium chloride can be added at 0.5 percent of the total diet to prevent the stones from forming.

Club lamb fungus has become a problem in recent years. It is a fungal infection (ringworm) that appears to be caused by *Trichophyton verrucosum* and perhaps a *Microsporum* species. The disease in lambs may first appear as 1 to 1½ inch circular patches of crusted wool or hair which, when pulled, comes off leaving a wet, raw skin surface. Numerous patches may develop which grow longer and merge with each other to produce large areas of raw seeping skin. These areas may occur on the face or other non-wooled areas or in the wool itself. The lesions may crust over only to be scraped off later revealing an unhealed, raw area. Following healing, scar tissue can result and black fiber may fill in the area.

Brushes, combs, blankets, shears, and other equipment may serve to spread the fungus from lamb to lamb and farm to farm. Feeding and grooming equipment should not be shared between farms and should be regularly disinfected with suitable disinfectant such as One-Stroke Environ, or chlorine as found in bleach (one part bleach to three parts water). Washing and grooming processes, and perhaps the practice of close shearing, may predispose young lambs to this infection by creating a moist environment on the skin, robbing the fleece of lanolin, creating

trauma to the surface of the skin by shears and combs, and increasing the potential for exposure to the fungus.

A number of compounds have been used to treat infected animals. Most are not labeled for food-producing animals and should only be used within the context of a veterinarian/client/patient relationship. Some are of questionable effectiveness, and response has been variable in many cases. Providing optimal nutrition, maintaining a clean, dry fleece, and avoiding potential exposure offer the best hope of maintaining a fungus free lamb.

Humans handling infected sheep should protect themselves by wearing rubber gloves and by carefully washing after handling lambs with a gentle fungicidal soap. Most human infections are acquired by contact with infected grooming equipment and handling infected animals.

Prolapsed rectum occurs when the lining of the rectum protrudes from the anus. This may be only a small amount of moist pink tissue or a mass the size of your fist. The exact cause for this condition is not known, but it is believed that docking tails too short, coughing, diarrhea, and possibly genetics may make it more likely to develop. This is a condition that must be surgically treated by your veterinarian.

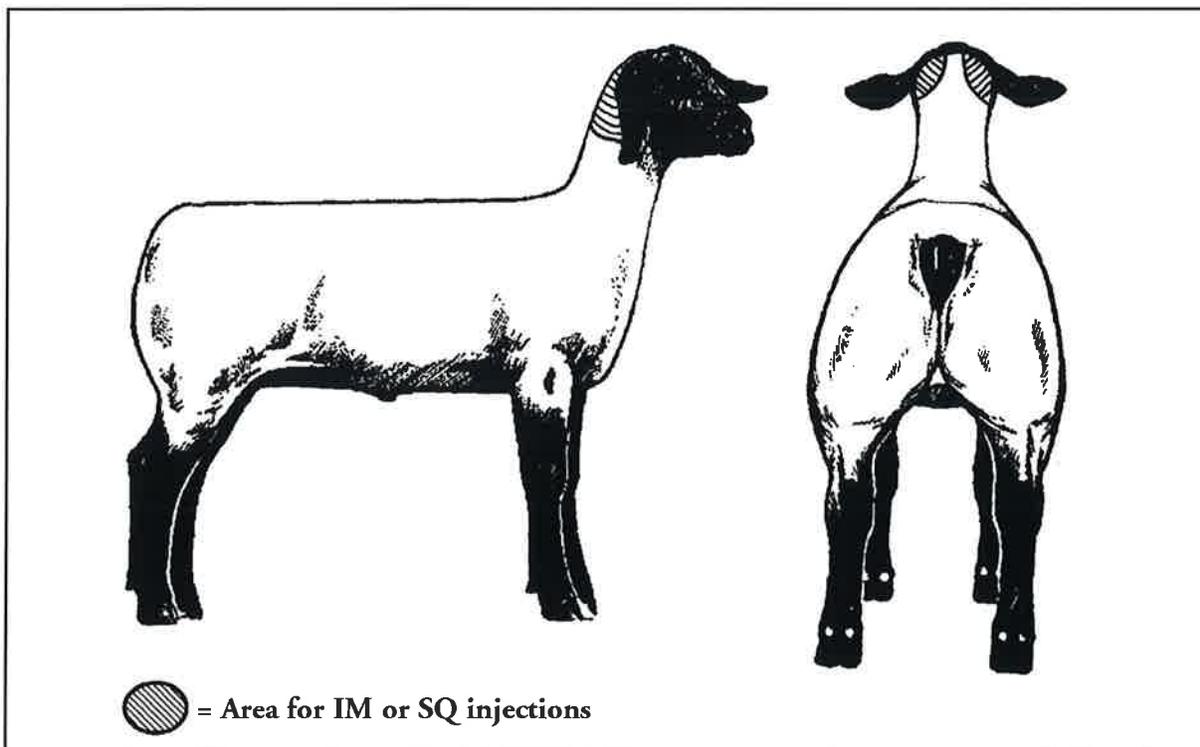
Abortions can be caused by several kinds of infectious bacteria and some viruses. Most abortions occur in the last one-half or one-third of pregnancy. Lambs are usually born dead but may be born very weak. Often the ewe is not sick unless complications develop. Sometimes abortions may affect as much as half the ewes. Because this problem is usually contagious, it is not a good idea to commingle strange groups of sheep during pregnancy. Vaccines are available for only a few kinds of abortions. Consult your veterinarian for advice on prevention.

If an abortion occurs, place the dead lamb and afterbirth in a clean container and pack with ice to keep it cold. Take it to your veterinarian or diagnostic laboratory to determine the cause. Most causes of abortion in sheep can also cause people to become sick. Use caution if you suspect an abortion has occurred. Handle dead lambs,

afterbirth, or liquid discharges from the ewe only with plastic gloves or equipment that can be cleaned. Wash carefully after handling ewes that have aborted, and do not contaminate your home or kitchen by bringing in weak lambs that may have been born to an infected ewe.

Suggestions for Proper Use of Animal Drugs

- Properly restrain the animal before giving an injection.
 - Give injections according to label directions. (See sample prescription label.)
 - (PO) and/or (O) means orally in the mouth or water; subcutaneous (SQ) means under the skin; intramuscular (IM) means in the muscle; intravenous (IV) means into the blood.
 - When the label directions permit, give injections under the skin so that the muscle tissue is not injured.
- Use sterilized needles and syringes. Keep the bottle cap clean.
 - Give injections at clean, dry sites on the animal.
 - Do not transfer needles back and forth from animal to bottle because you may carry bacteria from the animal's skin back into the bottle.
 - A withdrawal time may be indicated on certain medication. This is the number of days that must pass between the last drug treatment and the day the animal will be harvested (slaughtered).
 - Maintain the medication/treatment record in your project record book. Be sure to include:
 - the animals treated
 - the date(s) of treatment
 - the drug(s) and vaccines administered
 - who administered the drug(s)
 - the amount administered
 - the withdrawal time prior to slaughter





Treatment Record For Vaccines, Medication, and Medicated Feed

Treatment Date & Time	Animal ID • Name • Species • ID Number • Description	Condition Being Treated	Estimated Weight	Treatment Given (Medication Dispensed, Amount and Route of Administration) Also include product lot/serial # if available	Print Name of Person Who Gave Treatment	Instructed Milk/Meat Withdrawal	Results/Comments (recovered, sold, or died)	Date & Time Withdrawal Complete	If this is an extra label or Rx drug, list the licensed veterinarian's name, address & phone number who prescribed or directed the treatment.

Keep this record for 12 months.