Friday, January 5

AM

9:00 **Virginia Sheep Producers Association Board Meeting (Open to the public)**

11:00 **Virginia Sheep Industry Board Meeting (Open to the public)**

PM

1:00 **"Current Issues in Sheep Health"**
Dr. Kevin Pelzer, DVM, VA-MD Regional College of Veterinary Medicine

2:00 **"Genetics of Scrapie Resistance"**
Dr. Scott Greiner, Dept of Animal & Poultry Sciences, Virginia Tech

2:30 **Break**

2:45 **"Lamb Marketing in Virginia: Historical Prices and Competing in the Future"**
Mr. Bill McKinnon, Dept of Animal & Poultry Sciences, Virginia Tech

3:15 **"Direct Marketing Off the Farm: What You Need to Know"**
Mr. Gary Hornbaker, Virginia Cooperative Extension, Leesburg, VA

3:45 **"Marketing Systems that Work for Me" – Producer Panel**
Moderator – Mr. Mike Carpenter, VA Dept of Agriculture and Consumer Services
Mainstream Marketing: Clinton Bell, Tazewell, VA
Graded Sales: Jim Riddell, VA Cooperative Extension, Louisa, VA
Direct Marketing: Martha Polkey, Loudoun Valley Sheep Producers Assoc., Leesburg, VA
Pennsylvania Market: Bob Herr, Narvon, PA

5:30 **Social Hour and Commercial Exhibits**

6:30 **Lamb Banquet**
"Manipulation of the Breeding Season"
Dr. Keith Inskeep, West Virginia University

Saturday, January 6

AM

7:30 **Virginia Sheep Producers Association Annual Meeting (Breakfast)**
Speaker: Mr. David Greene, ASI Region I Representative, White Hall, MD

10:00 **ROCKINGHAM COUNTY FAIRGROUNDS**

"Ewe Vaccination Programs"
Dr. Kevin Pelzer, DVM, VA-MD Regional College of Veterinary Medicine

"Nutritional Management of the Ewe Flock"
Mr. Pete Martens & Mr. Rodney Leech, Virginia Cooperative Extension

"Baby Lamb Management"
Dr. Dee Whittier, DVM, VA-MD Regional College of Veterinary Medicine

"Basic Handling Facilities"
Mr. Kenneth Townsend, Townsend Equipment

PM

1:30 **VIRGINIA BRED COMMERCIAL EWE LAMB SALE – Rockingham County Fairgrounds**

Youth Session
Saturday, January 6

AM

10:00 **Youth Sheep Stockman's Competition**
ROCKINGHAM COUNTY FAIRGROUNDS

Both a Senior and Junior Divison will be held with team and individual competitions.

Youth interested in participating are encouraged to contact VSPA at 540-231-9163. There is no entry fee to participate.

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2001 VA-NC Shepherds' Symposium

Presented By

Virginia Sheep Producers Association

GENETICS OF SCRAPIE

Scott P. Greiner, Ph.D.
Extension Animal Scientist, Virginia Tech

Scrapie is a slowly progressive infectious disease of sheep and goats, which causes degeneration of the central nervous system. Scrapie is one of several diseases known as transmissible spongiform encephalopathies (TSE) that affect animals and humans. Bovine Spongiform Encephalopathy (BSE), or "mad cow disease", is a TSE that degenerates the nervous system in cattle. In humans, Creutzfeldt-Jakob disease and Kuru are two known TSE diseases. Although these TSEs are similar, there is no evidence that the diseases are transmitted between species.

Transmission of scrapie from sheep to sheep is thought to occur through direct contact (lateral transmission). Vertical transmission, or from the ewe to developing fetus, is unlikely. The scrapie agent is most commonly transmitted from an infected ewe to her own or other lambs during the first few months of life. This lateral transmission may occur orally or nasally, as the scrapie agent has been found in various sheep tissues and body fluids including central nervous system tissue and the placenta. The role of environmental contamination with the scrapie agent (feed, water, bedding) is not known. However, the scrapie agent is very resistant to heat and common disinfectants.

The incubation period for scrapie is relative long, ranging from two to five years. Due to this long incubation period, many sheep die from natural or other causes prior to developing clinical signs of the disease. The long incubation period also contributes to the difficulty of assessing the prevalence of the disease. Early symptoms of scrapie include anxiousness and excitability, with head/neck tremors and uncoordinated movement. Advanced stages of the disease are characterized by progressive weight loss, and intense rubbing and scraping against anything to relieve itching of the skin, as well as uncoordinated movement and violent shaking. Rubbing, and scratching with legs or wool biting, results in broken wool and loss of wool. These clinical signs are similar to those found with other diseases including external parasites and listeriosis. Presence of scrapie must be confirmed with brain tissue samples after death. A live-animal test using lymphoid tissue from the third eyelid is currently under development, and shows great promise. No blood tests or other procedures are currently available for diagnosis of the disease in the live animal, and there is no treatment for the disease.

Current research supports that scrapie is caused by an infectious protein particle called a prion or prion protein. These scrapie prions differ from normal proteins only structurally (in the way they are folded). These scrapie prions appear to have the ability to recruit other normal proteins and induce them to alter their structure to become scrapie prions. This is quite different from other infectious diseases, commonly caused by bacteria or viruses which replicate themselves and multiply. In the case of scrapie, the infectious agent (prion) is a conversion of the sheep's own protein that causes disease. This scrapie prion also has another unique attribute- no antibodies are formed since the infectious prion protein is formed by the host itself. Since no antibodies are produced as a means of

fighting the infection, common live-animal blood tests that rely on detection of antibodies for a specific pathogen are not applicable. For this reason, detection of scrapie in the live animal is difficult and limited.

The relationship between scrapie and genetics is becoming clearer. In 1979, a British researcher published results of a twenty-year study investigating the genetics aspects of scrapie. In his research, Perry studied flocks with high levels of scrapie and selected rams whose progeny did not die of the disease (even though they were exposed). The research identified rams whose progeny never developed the disease despite continuous exposure, with many of the lambs reared by dams that developed clinical signs during or after lactation. Today, we know these rams must have been "RR" genotype.

In the last twenty years, the scientific understanding of the relationship between scrapie and genetics has grown tremendously. It is important to recognize that scrapie is not transmitted genetically (and therefore not a genetic disease), rather the ***susceptibility*** to scrapie appears to be genetic.

Proteins are manufactured by the joining together of amino acids. Genes code for the sequences of amino acids that form a protein. Genes are made up of stretches of DNA, which is the basic hereditary material of organisms. Variations in proteins (amino acid sequences) are coded for by different forms of genes, known as alleles. In the case of scrapie, the amino acid of interest is located at codon 171 (codons are stretches of DNA that code for a single amino acid). There are two basic alleles at codon 171 that have been found to be related to scrapie susceptibility or resistance. The "Q" allele is known to produce proteins that are susceptible to conversion to scrapie prions. The "R" allele is thought to produce proteins that are not susceptible to this conversion to the scrapie prion (resistant). A sheep will have two copies of the prion gene in each cell. These copies may be the same or different alleles (i.e. "Q" or "R"), and each cell will contain the same copies. Therefore, a sheep may have a genotype of "QQ", "QR", or "RR" at codon 171. "QQ" would indicate the sheep has two copies of the "Q" allele, "RR" two copies of the "R" allele, and "QR" one copy of each allele.

So how do "Q" and "R" relate to scrapie susceptibility? Research conducted at Washington State University and USDA found that 30 out of 30 scrapie-affected sheep had a genotype of "QQ" at codon 171. A total of 565 sheep were studied. Of the normal (unaffected) sheep, 56% also had the "QQ" genotype. It is important to recognize that sheep with the "QQ" are not necessarily carriers of scrapie or infected with the disease. To be a carrier, a sheep must be exposed to the scrapie agent. The genotype "QQ" is associated with higher susceptibility to the disease. This has been demonstrated experimentally with sheep that were inoculated with the scrapie agent and monitored for up to 10 years for clinical signs of the disease. Of the 105 sheep inoculated, 63 developed clinical signs of scrapie. All infected sheep had the "QQ" genotype. No sheep with the "QR" or "RR" genotype developed the disease. This also is evidence that the "R" is dominant, as the presence of one "R" was associated with resistance.

As mentioned before, "Q" and "R" alleles code for a specific amino acids in the protein's structure. For the sheep prion protein, changing the 171st amino acid (coded for by codon 171 of the gene) from "Q" (glutamine) to "R" (arginine) changes the prion's ability to convert to a scrapie prion. A prion protein with an "R" at codon 171 appears to be resistant to conversion to scrapie prion.

With this evidence, it makes sense to avoid "QQ" genotypes that are more susceptible to scrapie. Genotype at position 171 of the prion gene can be determined from a blood sample on any sheep. This genotype can be used as a selection tool to enhance resistance to the disease within a flock. Since "RR" and "QR" sheep have never been diagnosed with a clinical case of scrapie, genetics may play an important role in the eradication of the disease as well. There has been some concern that "RR" and/or "QR" sheep may be carriers but never show clinical signs, or have extended incubation periods which are beyond the normal life of a sheep (and therefore are not diagnosed with the disease). However, it has never been demonstrated that a sheep can carry the scrapie agent without becoming infected itself (i.e. sheep that transmit the disease also will exhibit clinical signs at some time).

So how can codon 171 genotype be used in selection? Keep in mind that each ram or ewe will pass on one copy of each chromosome to its offspring. For sheep that are "QQ" or "RR", only "Q" or "R" sperm or eggs will be produced. For sheep that are "QR", either a "Q" or an "R" may be passed on. By knowing the genotype of the two sheep in any mating, the probability of the resulting progeny genotype can be predicted. As an example, assume we have a "RR" ram that we mate to a "QQ" ewe. A Punnett square can be set up to determine the possible resulting progeny genotypes.

		Ram	
		R	R
Ewe	Q	QR	QR
	Q	QR	QR

In this example, the ram only produces "R" sperm and the ewe only produces "Q" eggs. The resulting genotype of every lamb from the mating will be "QR".

Assume a "QR" ram is mated to a "QR" ewe. In this case, both the sire and dam can pass either the "Q" or "R" gene.

		Ram	
		Q	R
Ewe	Q	QQ	QR
	R	QR	RR

From this mating, three genotypes are possible in the resulting progeny. One-fourth of the lambs will be "QQ", half will be "QR", and one-fourth will be "RR". In other words, three-fourths of the lambs will carry an "R" and be resistant.

A "QR" ram mated to "QQ" ewes will result in 50% of the progeny carrying an "R".

		Ram	
		Q	R
Ewe	Q	QQ	QR
	Q	QQ	QR

Codon 171 genotype should be a selection tool for all seedstock producers who sell rams and/or ewes. This selection should start with stud rams. Rams that are "RR" or "QR" should be utilized so that a high percentage of the resulting offspring carry the "R" factor. So what is the frequency of "Q" and "R" in the current sheep population in the U.S.? To date, most of the scrapie work relative to genetics has been conducted with the Suffolk breed. The Suffolk breed is know to have the highest incidence of scrapie, although the disease has also been diagnosed in Border Leicester, Cheviots, Corriedales, Cotswold, Dorset, Finn, Hampshire, Merino, Montadale, Rambouillet, Shropshire, Southdown, and several crossbreds. Before testing was available, it was estimated that approximately 40% of black face sheep in the U.S. were "QR". It is likely that the frequency of "R" has increased in recent years due to selection. One only needs to attend shows and sales to recognize the importance codon 171 genotype has to seedstock breeders. "RR" sheep often are sold at a premium, and "QQ" sheep are often penalized. There are certainly a number of "RR" and "QR" rams available, and scrapie resistance can be incorporated into a selection scheme without sacrificing other economically important traits.

For seedstock breeders, starting with "RR" or "QR" rams is the first step, regardless of the genotype of the ewes. The genotyping blood tests cost from $16-17, depending on the number of sheep tested. Initially, whole-flock testing may be cost prohibitive especially if the genotype of the ewe flock is unknown. Once "R" has been introduced through the use of rams with known genotype, potential replacements can be screened. It may be most advantageous to use the genotype as a selection tool, rather than a culling tool. Remember that "QQ" ewes can be mated to "RR" rams and produce progeny that are 100% resistant. It would not make sense to cull the ewe flock of productive "QQ" ewes based solely on their codon 171 genotype. However, these ewes need to be mated to produce lambs that are "QR". Seedstock breeders need to remember that if a sheep you sell is ever diagnosed with scrapie on another producer's farm, your flock will be considered a source flock. For this reason, many seedstock breeders only sell "QR" and "RR" sheep.

So what are the implications for commercial producers? Commercial producers are in a different position than seedstock breeders, assuming that they do not sell breeding stock. However, scrapie can infect crossbred commercial flocks just as it can purebred flocks. Therefore, when replacements are being kept, "QQ" rams should be avoided. Utilizing "RR" and "QR" rams will have the impact of adding resistance to the ewe flock.

Scrapie is a disease that poses great threat to the U.S. sheep industry. For the U.S. industry to remain viable and competitive, programs that reduce and eliminate the disease must be embraced. Genetic selection for reduced susceptibility to the disease is a viable tool for the industry to utilize to reduce the incidence of clinical scrapie in sheep.

References

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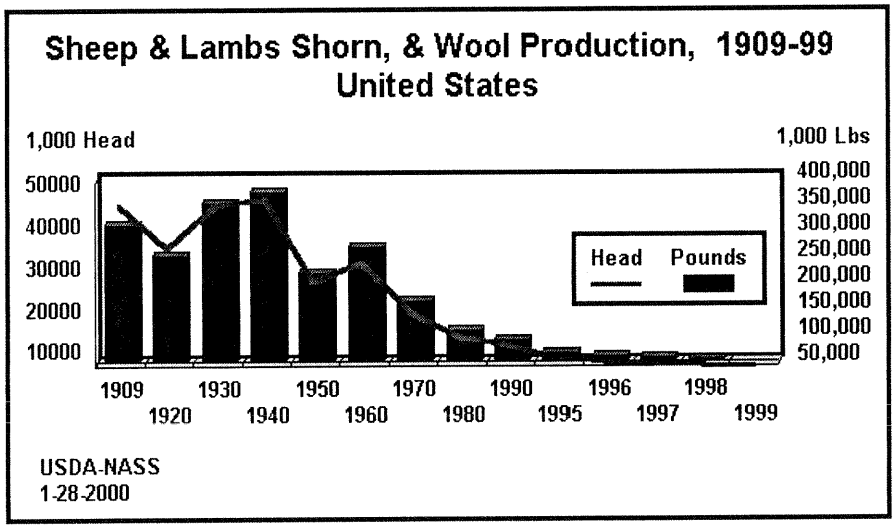
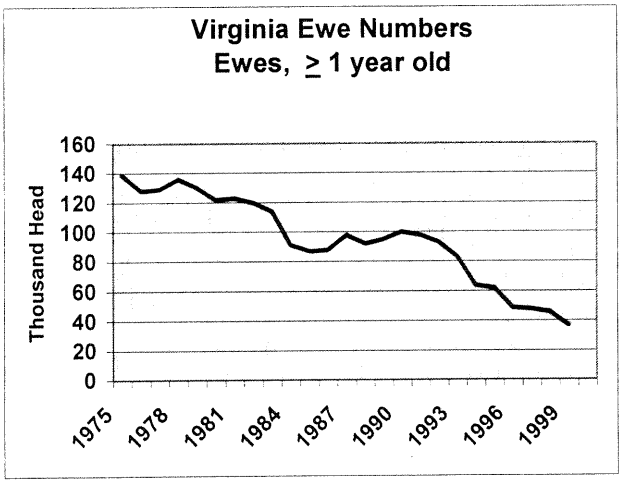
LAMB MARKETING IN VIRGINIA: HISTORICAL PRICES AND COMPETING IN THE FUTURE

Bill R. McKinnon
Extension Animal Scientist, Marketing

The shrinkage of the U.S. sheep industry continues to put increasing pressure upon producers particularly in the area of lamb marketing. The causes for the disappearing U.S. sheep industry are varied and include decreased demand for lamb and wool, predator damage, loss of the wool incentive program and shifts in producer interests.



The Virginia sheep industry has largely followed the pattern set by the nation's sheep flock. Loss of farmland to non-farm uses and a shift to more part-time farm operations have contributed to the decrease in sheep numbers in addition to above mentioned causes of the national industry decline. During the past twenty-five years, Virginia has lost over 100,000 breeding ewes. The state's current breeding flock stands at less than 40,000 ewes.



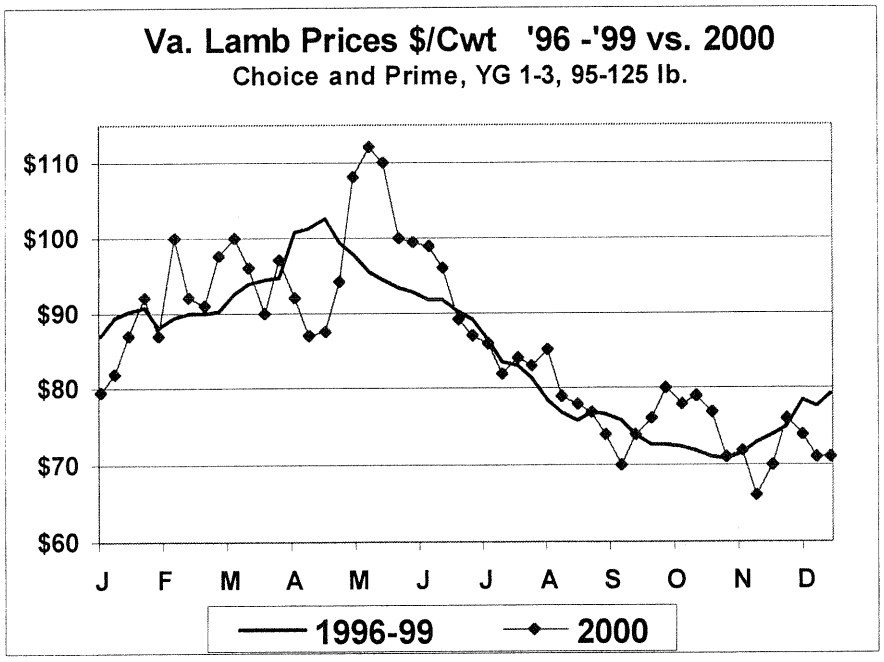
The dramatic loss of sheep numbers has had devastating impacts upon the remaining industry. The industry has seen vital pieces of the underlying business infrastructure simply disappear. Most notable among this infrastructure decay has been the loss of lamb packers, particularly those sizable packers located east of the Mississippi. There is currently only one lamb processor that handles more than a couple of hundred lambs per day located within practical hauling distance to Virginia. Currently several relatively smaller packers who would have difficulty handling as many as a semi-load of lambs at one time are processing lambs produced in the mid-Atlantic region.

The smaller number of lambs being produced and marketed also creates a very "thin" lamb market in Virginia. Most local livestock markets routinely have less than a hundred lambs per week. Additionally within that typically small number of lambs there are extreme variations in weight and quality. In many cases the lambs are purchased by a lamb broker or dealer who must take a portion of the lambs home and add them to other purchased lambs. Here the lambs may be sorted into groups to be fed longer while others are sorted into lots to meet the particular demands of the various small packers. All this adds an additional level of inefficiency and costs.

The "thin" lamb market in the region makes lamb price discovery very difficult. The Virginia Department of Agriculture and Consumer Services offers a weekly commodity newsletter that provides a weekly summary of lamb and sheep sales within the state. The department also maintains a web site (http://www.vdacs.state.va.us/marketnews/sheep.html) that provides a more immediate market update. The lamb market condition also reduces price predictability. Unanticipated higher lamb numbers at one location on a particular date can quickly fill the local demand. Wide swings between locations within the state can occur within one week. The market has an additional unpredictability to it in the area of price level paid for various lamb weight and finish category. Conditions even occur when lighter weight lambs may bring more dollars per head than heavier lambs.

Within the Virginia sheep industry the last twenty-five years have also brought more diversity to production programs, genetic base and market weight and quality of the lambs produced. During the same period, the size of the average Virginia ewe flock has shrunk from approximately 46 to 27 head. This shift in production has the effect of creating increased variation within a smaller number of lambs to be marketed.

The one facet of the lamb market that does seem to have some predictability is the seasonal pattern evident in prices paid. Though there may be single year variations, the highest prices paid for lambs in weekly or monthly scheduled sales tend to come in April and May. Producers selling lambs during the spring months must overcome the spring lamb predisposition of sheep and relatively higher cost of producing spring market lambs. Predictably the lowest prices of the year are paid during the September-November period as many lambs are marketed directly off grass when pastures decline. Knowledgeable producers must factor this typical seasonal price pattern into their individual production/marketing programs.



To address the problem of small numbers of lambs, producers within various regions of the state are working together put together marketable group of lambs. Some producers in the Madison and Harrisonburg areas have decided to target their lambs toward state graded sales on a particular date in each month at their local market. Another group, the Old Dominion Livestock Producers Association, also works together to assemble larger numbers of lambs and other market sheep on targeted dates. The ODLPA is particularly sensitive to the price advantage of marketing toward various ethnic holidays.

Several Virginia producers have explored the potential of hauling lambs to out of state markets many times enticed by reports of higher prices. Producers need to be sure they understand the total costs involved and the resultant net price. In addition to extra fuel and labor or hired hauling costs, the impact of shrink upon net price is important. Shrinkage is defined as weight loss from the loss of gut fill and tissue shrink. Extrapolating data from cattle research, the table below lists expected percent shrink resulting from various hauling conditions.

Hauling Conditions	Percent Shrink
25 mile haul	1.8%
50 mile haul	2.6%
100 mile haul	3.3%
200 mile haul	3.9%
8 hours in moving truck	5.5%

If resulting shrink of 1.8% from a 25 mile haul is used the baseline conditions to mimic local marketing, the impact of more distant hauling conditions can be examined.

Haul, weight and sale condition	Lamb Sale Wt.	Net $/Head	Equivalent $/Cwt Needed
25 mile haul (local) @ $70/cwt.	120 lb.	$84.00	$70.00
200 mile haul – additional shrinkage 2%	117.6 lb.	$82.32	$71.43
8 hour haul – additional shrinkage 3.5%	115.8 lb.	$81.06	$72.54

Changes within the U.S. and Virginia's sheep industry during the past two decades have placed more pressure on the producers to get the most advantageous price for their lambs. With significantly smaller lamb numbers and a decaying infrastructure, producers cannot rely on some of the more traditional marketing methods to bring lamb prices near the top of the available range. Increasingly, producers will have to take a more proactive and aggressive approach to lamb marketing. With the state's relatively small sheep flocks, neighbors working together to pool lambs into larger, more attractive lots would appear to offer much potential. Other producers will explore direct marketing options which can reward sellers for the extra time and effort they apply to marketing. With each passing year, it will be more important for Virginia's sheep producers to shoulder more of the load for marketing their lambs. Just unloading their lambs and hoping for a favorable price may lead to more disappointment in future years.

DIRECT MARKETING OFF THE FARM: WHAT YOU NEED TO KNOW

Gary W. Hornbaker

Direct marketing offers many producers an opportunity to increase the return on products sold. In the sheep business when we talk about direct marketing it is usually in reference to marketing finished lambs for meat. However, depending on the location, size, and type of sheep operation you have, you may have several opportunities for direct marketing. Some examples of direct marketing include:

- freezer lambs
- feeder or club lambs
- breeding stock (rams/ewes, purebred/commercial)
- research animals
- wool
- pelts/skins
- manure
- specialty products (sausage,"rent a sheep", grazing, rodeo)

While I do not claim to be a marketing expert, I have had some experience with each of these opportunities in my 35 years of raising and marketing sheep products. I realize my comments may not apply to everyone's operation, but I think there are some marketing basics that apply to all livestock producers. The first basic question is **"how much time, effort, and money can you afford to devote to direct marketing for a increased return?"**

Let's look at some of the basic concerns that you may encounter when you begin to do direct marketing.

Time – Direct marketing requires extensive personal contact with perspective customers. Being available to answer questions, show products, assist with facilities for "on farm slaughter", travel to shows, etc. all take time. You need to do a self-assessment of your personal (and family) time availability and schedules to determine how much time and effort you can afford to devote to direct marketing. Most of the time customers want to buy when they have free time (weekends or holiday), consider if that works into your schedule. One sure way to eliminate yourself from direct marketing is to tell your customers that you don't have time to deal with them.

Facilities and equipment – I would suggest producers need to do a self assessment of your facilities to honestly answer if you are set up to do direct marketing. For slaughter this might mean at least a place with water, an arrangement to hang a carcass for processing, and disposal of offal. For marketing live animals it may mean having pens for sorting of animals, holding animals, loading ramps, etc. For marketing products it may entail freezer space, products storage areas, and packaging. Many times we overlook the need and expense of equipment – don't forget it does cost to haul animals and products.

Taxes and sales fees – When you begin direct marketing you become a retailer of products, and with that comes the responsibility of collecting and filing the appropriate taxes and associated fees. In Virginia we have a lamb check –off fee in support of the Virginia Sheep Industry Board. According to *Code of Virginia- Chapter 43, Section 3.1-1078* the handler shall collect the tax (check-off) and make payment to the tax commissioner of sheep sold , and maintain those sales records for at least three years. Also, the collection and filing of Virginia Sales Tax becomes an issue. I would advise producers to research any local or state tax responsibilities that may apply to direct sales.

Product knowledge – It is absolutely necessary that you know your product and the value or cost associated with that product. The following are a few questions that are basic to answering inquiries about direct sales:

1) Do you know your true cost of production?
2) Do you know what your price for an animal or product is?
3) Do you know the grades or standards of your product for comparison?
4) Do you have a standard list or set of charges for products or services? Is it the same year round?
5) How do you handle money collections?
6) Do you have any guarantees or satisfaction policy?
7) Do you know what processing fees may cost (slaughter, transportation,tanning,postage)

You may find it convenient to develop a brochure or fact sheet about your products so it doesn't become necessary to answer every inquiry about a possible sale.

Promotion- Advertising and promotion are critical factors to your success. The means by which you do this will vary with each individual. Some ideas include: farm signage, mailings, field days, exhibitions, festivals, web site, and associations.

There is some help available to producers to assist with promotion efforts. However, **do not expect other people to sell your products for you!** The following are a few of the agencies and organizations that may offer assistance:

- Virginia Cooperative Extension – educational materials and resources
- Virginia Department of Agriculture & Consumer Services – marketing division, economic development, "Virginia's Finest" program
- American Sheep Industry Association – promotional materials
- Local Government – agriculture and/or economic development departments
- Breed or Product Associations
- Organization newsletter or publications – (Farm Bureau, Farm & Electric Coops, Tourist offices,etc.)

Of all the possible promotion techniques, "word of mouth" is still the best advertisement.

There are some regulations that cover specific products that may be marketed. If you are interested in marketing meat there are several regulations you must follow. The key is to know what regulations apply, and when they apply. Maybe more important is to know where to get answers about regulations!

In the United States there are basically three types of meat inspections:

1) Livestock slaughtered and/or processed in a federally inspected facility – this meat may be sold anywhere in the U.S., subject to labeling requirements.
2) Livestock slaughtered and/or processed in a state inspected facility – can be sold only in the state in which processed (intra-state sales)
3) Livestock slaughtered and/or processed in a custom processing facility- this meat may or may not be inspected, may not be sold to anyone else, and must be marked "Not for Resale"

Most states have laws regarding meat inspection and sales, however, most states receive that authority through the federal *Wholesome Meat Act*. The handling and sales of meat and meat products can be very regulated! However, the law does allow for home slaughter of animals for home usage.

A word of caution from personal experience -- you may allow others to come to your farm and slaughter animals that you sell, however, if you assist your buyers in the slaughter or processing of those animals you may be considered a meat handler. If you transport meat from a facility to a buyer you may be considered a meat handler. Under state regulation if you are selling, transporting, or handling meat you may come under inspection from VDA&CS and health department !!!

A few words of advise –"Sell animals by the head (selling by weight requires certified scales), get paid up front (it is too late to negotiate price after the animal is slaughtered, and the buyer owns the animal at the time of slaughter), do not assist with "on farm slaughter"(but make it very clear of what your expectations are of others that do the slaughter), have a plan in place for the disposal of anything left after the slaughter process, and continue to try new ways of education, promotion, and communication. And finally – **remember direct marketing is a challenging on-going process that isn't for everyone, if it were easy everybody would be doing it, and sometimes what might sound like a tremendous price or opportunity really isn't!!!** "

I have several handouts that may be used as a reference for you.

The information I have provided is for educational purposes only. I would recommend that producers check any local, state, or federal requirements before beginning a direct marketing business

MAINSTREAM LAMB MARKETING IN SOUTHWEST VIRGINIA

Clinton Bell

Sheep producers basically have two options in which to market lambs – Eastern Lamb Producers Cooperative or weekly livestock auction markets.

Eastern Lamb Producers Cooperative

- Managed by Joe Meek, Pulaski Livestock Auction Market
- Producer consigns lambs through local Cooperative Extension Office
- Lambs are sold on farm and taken up later
- Can market slaughter lambs, feeder lambs, and butcher ewes
- Allows small producers more marketing power by comingling lambs to make load lots and more buyer exposure
- Lambs are state graded

Weekly Livestock Auction Markets

- Producer brings lambs to the market on sale day
- The market will sell all classes of sheep
- Some markets comingle, some sell ownership lots
- In Southwest Virginia, lambs are sorted by weight – are not graded in the Valley of Virginia
- Some markets grade
- Most lambs are purchased by livestock dealers and go through Pennsylvania markets

CENTRAL VIRGINIA SHEEP AND WOOL PRODUCERS ASSOCIATION STATE GRADED LAMB AND SHEEP SALES

James E. Riddell
Extension Agent, Louisa County

The Central Virginia Sheep and Wool Producers Association, formerly known as the Orange Area Wool Pool, has a long history of providing cooperative marketing opportunities for sheep producers. Organized in the 1950's by sheep producers such as Jack Graves of Madison and Bill Hess of Orange, the multi-county Wool Pool served as the primary marketing system for wool in much of central and northern Virginia.

In 1980 at the urging of area producers and Virginia Tech's Extension Sheep Specialist, George Allen--Extension Agents, sheep producers, and Virginia Department of Agriculture and Consumer Services Marketing Specialists organized and conducted the first state-graded market lamb sale in the area.

In the early years—seven sales were held a year from May-August at the Madison Livestock Market. Only slaughter lambs weighing 85-125 pounds were sold and to one buyer, Fred Stapf. All of the lambs were graded and weighed and comingled and sold by grade lots. The price paid to the producers was a 3-sale average price using the most current Harrisonburg, Staunton, and Winchester market prices as a base.

In the mid-to late 80's, working with the Eastern Lamb Producers Co-Op, the electronic auction (via computer) was used to sell the market lambs. Lambs were sold by computer on Wednesdays and taken up (state-graded, weighed, and sorted) on the following Mondays at the market. The sale also began to sell feeder lambs and sheep at certain sales.

In 1990 the sheep producers decided to sponsor a new once-a-month state-graded lamb and sheep sale at the Madison Livestock Market. This sale today accepts and offers healthy market lambs, feeder lambs, yearlings, cull rams and ewes, and other sheep suitable for feeder or slaughter purposes. Lambs and sheep are taken in from 7:00-9:00 A.M. on sale days and sold to the highest bidder at 11:30 A.M.--using the telo-auction and also live bidding at the market. The marketing fee is $1.75 per head plus check-off fees.

The sale attracts a variety of buyers—those looking for traditional slaughter lambs, buyers desiring lighter lambs for the ethnic trade, individuals who buy slaughter ewes and rams, and others. 4-5 buyers typically are present on the telephone or in person for each sale.

2001 marks the 22nd year of cooperative lamb and sheep marketing programs for the Central Virginia Sheep and Wool Producers Association. Sales are sponsored monthly and are strategically scheduled prior to ethnic holidays when the demand for lamb is increased. Sales in 2001 are as follows:

January 17	June 20	October 17
February 28	July 18	November 14
April 4	August 15	December 12
May 16	September 19	

In 2000 the association sold 2158 lambs and sheep totalling $150,462.32

The association also sponsors workshops and educational programs with Virginia Cooperative Extension for area sheep producers each year. The state-graded sale itself is a very effective educational program, especially for new producers. Producers learn quickly which grades and weights of lamb are is in demand and management and breeding information is shared regularly by producers at the market.

The success of this marketing program has been due to the consistent quality lambs and sheep consigned by the producers, the support of the Madison Livestock Exchange, the producer association, the buyers, and the cooperative efforts of the Virginia Department of Agriculture and Consumer Services and Virginia Cooperative Extension.

SELLING LAMB SAUSAGE IN LOUDOUN

Martha Polkey
President, Loudoun Valley Sheep Producers Association

The Loudoun Valley Sheep Producers Association sausage-making project began and has continued as a way to help its members get top prices for their lambs, by selling cooked as well as frozen product at local fairs and through local markets. During the past three years LVSPA has purchased more than 50 lambs from its members and paid them an average of $2 a pound (hanging weight). Sales of sausage at our main fundraising event have increased 40% each succeeding year.

The organization has met various challenges as the marketing effort has grown and expanded. These include:
- maintaining a good volunteer base;
- meeting processing, labeling, and food-handling regulations;
- improving quality and yield of lambs purchased;
- meeting liability concerns;
- dealing with increasing processing costs; and
- making adequate preparation for an expanding market.

Opportunities for increasing sales exist. The sausage has sold well and has built a following. We are now negotiating with other small local markets to offer it more widely. Our members are producing better-finished animals, with higher yields that keep processing costs per pound of sausage lower. LVSPA's presence at local fairs and events has improved the visibility of the organization, and has helped some members market their other farm products, such as freezer lamb, goats, and wool products.

About the organization

The Loudoun Valley Sheep Producers Association is an 8-year-old nonprofit volunteer group operating in one of the fastest-growing counties in the United States. Here in northern Virginia we are striving to make small-scale agriculture a workable proposition, in a county where farmland is disappearing faster than you can say "3-acre executive estates."

Our members are mostly small flock owners, with flock size ranging from a couple to a hundred sheep. We have been working together at our monthly meetings to help each other in the shepherding business. We keep a reference library with videos, information sheets, books, and periodicals, and sponsor speakers. We publish a monthly newsletter and annual directories—one aimed at the freezer lamb consumer, and one listing all the products our members offer. We also support our county 4-H sheep clubs.

Making sausage

One of our founding members was very active in a Scottish heritage group, and the first product we cooked and served, for several years at Celtic festivals, was lambburger made from donated lambs. Our first sausage was made from mutton. When we decided to focus on sausage, and especially frozen product, we began using only lambs ("lamb sausage" sounds so much better than "cull ewe sausage").

We had two ways to market this whole-lamb sausage: sales of cooked product and retail sales. Both avenues were immediately open to us, because another of our members owns a small country store in Waterford, Virginia. Preserved and picturesque Waterford (founded in 1733) is the site of the annual Waterford Fair in October. About 35,000 visitors and participants attend this top-of-the-line historic craft fair. We set up our first food booth at the fair in 1998. At that event we sell the sausage on a bun, sausage pieces on a stick, and frozen sausage. (The latter is available at the store year-round.) At the 2000 fair, we sold almost 400 pounds of cooked and 200 pounds of frozen sausage.

We have set up booths at several smaller local events, including the Loudoun County Spring Farm Tour, fall festivals, and a country fair and dance at a county farm museum. Sales of sausage at these small events have been minor, but at each we made contact with more customers, distributed our brochures, and spread our name about.

The challenges

All volunteer, all the time. The greatest strength of the Loudoun Valley Sheep Producers Association is its members. It is an all-volunteer organization, and all we do is done with donated time and expertise. The fact that so many of our members are part-time farmers has added to the strength of the group, because their other occupations—as printers, graphic and fine artists, lawyers, store owners, engineers, community leaders, computer specialists—have all brought invaluable resources to LVSPA.

Still, one must gear the activities of the group to the time that members can give. Some goals take longer to reach because of limited volunteer time, and the organization's officers know they must take care not to burn out the most active members. We have learned to choose wisely where to focus our volunteer resources, and to try to encourage "dormant" members to come alive.

The rules and regs. Another challenge is mastering regulations that have to do with selling a retail product. A USDA-certified processor produces our sausage, and we first picked up our meat in boxes properly stamped. This was legal procedure for sausage we planned to sell as cooked product. But it was insufficient for selling sausage retail. At this point a proper label (every minute detail of which is dictated by regulations) had to be obtained by the processor and approved by the federal meat inspector. A safe handling label also was required. We have a legal label, although not yet the perfect one.

Food booths require permits from the county health department, and are inspected daily by county officers. We have learned that our quick attention to any infraction, no matter how slight, has given inspectors confidence in our operation—as has the fact that three of our members have attended a county-run food preparation course.

Improving yield and producer knowledge. Our members raise many breeds of sheep—among them Icelandic, Lincoln, Merino, Dorset, Karakul, Barbados, Cheviot, and commercial crosses. Most of them were not 4-H club members as children, and thus did not grow up feeling for length of loin and thickness of leg.

We have sought to increase their knowledge. At one on-farm membership meeting, members brought lambs from their farms for state grader Mike Carpenter to evaluate and teach us what to look for in a finished lamb.

In addition, payment for lambs we buy from members is pegged to the yield of the animal. Low-yielding lambs mean the same amount of processor labor for less meat, and we may pay only $1.60 a pound for such animals. Some of our members consistently produce lambs that yield higher than 60%; those animals bring them $2.25 a pound, hanging weight.

We also inform members how vital it is to keep good records of antibiotic and anthelmintic use: Our slaughter dates are published well in advance, and members are asked to sign a form certifying that their lambs are free of such residues, on the day the lambs are taken to the processor.

Liability questions. LVSPA is presently applying for nonprofit corporation status from the state of Virginia, to give legal protection to the organization's officers. With that and with federal nonprofit status, we may be able to take advantage of other USDA resources to help with our cooperative sales efforts.

Costs. The greatest challenge for this project is the potential for increased processing costs. Our locker plant has been strapped for employees like many other businesses in these flush times, and in the last 12 months has raised our per-pound processing rate almost 50%. Finding another processor who charges less is a difficult proposition, for quality of the product also may change, and establishing a good and dependable working relationship with a new processor is also uncertain.

Expanding the market. We are encouraged by the reception our sausage has gotten, but we know that before we consider expanding the market, we must ensure that we are prepared to meet the increased demand. We must gauge volunteer time needs, determine any additional regulatory requirements (e.g., if we decide to respond to customer requests to mail frozen product out of state), and ensure that our members will have an adequate supply of quality lambs at the time of year we need them.

The opportunities

A growing market for value-added products exists, and although our location at the western edge of Washington, D.C., is the cause of rapidly dwindling farmland in Loudoun County, it also is the source of our increasing sales. Lamb is eaten by more kinds of people in large urban areas, and specialty foods sell well in these comparatively upscale markets. Loudoun's countryside is still beautiful, and we believe that one selling point for our products is that they are one way new, more urban residents help keep the rural economy viable, and vital.

We have a hard-working and innovative department of economic development in Loudoun, which tries out many ways to create interfaces between buyers and sellers of agricultural products in the county. This is another bright spot that gives us confidence that our cooperative efforts will yield further success.

DOES OUT-OF-SEASON BREEDING HAVE A PLACE IN A RENAISSANCE IN THE EASTERN SHEEP INDUSTRY?

Keith Inskeep, Deborah Marsh and Paul Lewis
West Virginia Sheep Improvement Project

Presented at the VA-NC Shepherds' Symposium, January 5, 2001

In 1942, there were nearly 50 million sheep in the U.S. and about a million of those were in West Virginia. Since that time, numbers have declined continually. Today there are only about 5.16 million breeding age sheep in the U.S., with about 31,000 of those in West Virginia and 45,000 in Virginia. With decreasing numbers and increasing coyote predation in the last decade, many people in both Virginias have written off the sheep industry as a component of economic development. But a few young farmers have not heard that message: they see opportunities to take advantage of higher prices for lambs born out-of-season, ways to market specialty products from sheep, or ways to utilize their land more effectively by raising sheep.

Faculty members in the West Virginia Agricultural and Forestry Experiment Station and WVU Extension have begun to assist sheep producers in several counties in West Virginia, Maryland and Pennsylvania with techniques in breeding ewes out-of-season, forage management, management systems, and marketing. These efforts, in the West Virginia Sheep Improvement Project, are funded by the West Virginia Legislature. The State Legislature also has provided support, through the WV Department of Agriculture, so that USDA Wildlife Services can implement practices to control and deter predators on sheep farms.

The West Virginia Sheep Improvement Project, has headquarters in Franklin, which is in Pendleton County, the center of West Virginia's sheep population. Deborah Marsh is Project Director, with Georgette Plaugher as Research Assistant, Dee Singh as Graduate Research Assistant in agricultural economics, and Marlon Knights as Graduate Research Assistant in reproductive physiology. County agents, other faculty, and other graduate and undergraduate students participate in project activities. A West Virginia Sheep Improvement Project web-site is available at http://www.caf.wvu.edu/avs/sheep/.

In addition, Faculty members at West Virginia University and Virginia Tech, with collaboration from Faculty at Ohio State and Virginia State, have proposed to expand efforts to rebuild the sheep industry in the Appalachian Region. A one-page summary of the proposed activities in The Eastern Sheep Research, Education and Development Center is included as an appendix to this report. A key ingredient of the current and proposed projects is the concept that breeding ewes out-of-season will increase opportunities for growth and profitability of the sheep industry. This concept is based upon two premises. The first is that lambs born out-of-season can bring in higher prices and returns. The second is that losses of lambs to predators can be reduced for the lambs that are born at a time when the coyotes are not killing other animals for the specific purpose of feeding their pups.

Out-of Season Breeding

During the first year of the project (1998), techniques to allow out-of-season breeding were emphasized. Results of out-of-season breeding trials in that year encouraged more farmers to enroll in the project as cooperators and participate in the out-of-season breeding in the spring and early summer of 1999. Data from fall lambing in 1999 indicated that success was equal to or improved on most farms in the second year compared to the first.

Graduate student Marlon Knights has led the effort to compare methods for out-of-season breeding and for synchronization of estrus during the fall breeding season. These efforts have been supported by InterAg, a small company in New Zealand, and Pharmacia and Upjohn, Inc., as well as a grant from the USDA and FDA, under NRSP-7, a program to help in obtaining approval of new management products for minor species.

Trial 1. In 1998, the objectives were to determine whether a new progesterone-releasing intravaginal insert will induce fertile estrus, and whether follicle stimulating hormone (FSH) combined with the insert will increase prolificacy, in anestrous ewes introduced to rams. Ewes of mixed breeding on six farms (Table 1) were assigned to four randomized treatments, control, n = 73; 12 d progesterone(polycapralactone [PCL] insert with 0.82g progesterone), n = 73; 12 d progesterone plus i.m. FSH (Folltropin, 55 mg NIH-FSH-P1 equivalent) in propylene glycol, 24 h before insert removal, n = 71; and 5 d progesterone plus FSH, n = 77. Intact rams (1:15 ewes in multiple-sire groups) with marking harnesses or painted briskets were joined with the ewes at insert removal, and raddle marks were observed every 12 h for 5 d. On d 26 to 30, rams were removed; ewes were examined for pregnancy then and again 20 d later. Results obtained are summarized in Table 2. Percentage of ewes marked by rams was greater in ewes treated with progesterone (66 to 79%) than in control ewes (12%; $P < 0.01$) and in those treated for 5 days (79%) than in those treated for 12 days (66%; $P < 0.05$). In FSH-treated ewes, ovulation rate tended to be greater after treatment with progesterone for 5 than for 12 d ($P = 0.09$; 3.3 ± 0.6 and 2.2 ± 0.4, respectively). More progesterone-treated than control ewes lambed ($P < 0.01$) to the first (38 to 45 vs 0%) or both (63 to 66 vs 41%) service periods. One interesting observation is that some ewes bred out-of-season lose one or more embryos between pregnancy diagnosis and expected lambing. Ewes that lost the entire pregnancy were recorded in this experiment. Pregnancy retention did not differ among treatments, but was greater ($P < 0.01$) in ewes that conceived at the first (90.9 ± 3.7) than at the second (72.5 ± 3.3) service period. Prolificacy at the first service did not differ between FSH-treated ewes (1.8 ± 0.1) and ewes treated with P_4 only (1.6 ± 0.1). However, FSH increased prolificacy to first service (1.8 ± 0.1) over prolificacy to second service (control ewes 1.5 ± 0.1; $P < 0.05$, and all ewes 1.4 ± 0.1; $P < 0.01$). It was concluded that the PCL insert in combination with ram introduction at insert removal was more effective than ram introduction alone to induce synchronized estrus and ovulation, and yielded higher pregnancy rates after one or two service periods. Treatment with progesterone for 5 d was as effective as for 12 d to induce fertile estrus in FSH-treated anestrous ewes.

Trial 2. Because the new PCL inserts tested in 1998 did not deliver as much progesterone as needed to mimic the luteal phase of the estrous cycle, we continued the work in 1999 using the original CIDR device for sheep and goats developed in New Zealand. The objectives of this study were to evaluate, in anestrous ewes, the effectiveness of: 1) a CIDR-G

device (0.3 g progesterone) administered for 5 d to induce estrus, and 2) FSH (Folltropin; 55 mg NIH-FSH-P1 equivalent) in saline:propylene glycol (1:4) 24 h before insert removal on d 0, to increase ovulation rate and prolificacy. Ewes of mixed breeding on 7 farms were assigned at random to 3 treatments, control (n = 125), 5 d progesterone (n = 257) and 5 d progesterone plus FSH (n = 271). Intact rams were joined at insert removal and ewes were observed every 24 h for 3 d. On day 14, the ovulation rates of all ewes detected in estrus in the progesterone-treated groups were determined using transrectal ultrasonography. Rams were removed on day 26 to 30; ewes were examined for pregnancy then and again, 20 to 25 d later to detect ewes that conceived to the second service period. Results are presented in Table 3. Percentage of ewes marked by rams was higher in progesterone-treated (77%) than in control ewes (20%; $P < 0.01$), but was not affected by FSH. The ovulation rate (1.95 ± 0.04) did not differ due to FSH. Conception (68%) and pregnancy (52%) rates were higher in progesterone-treated ($P< 0.01$) than in control ewes. Over two service periods more progesterone-treated than control ewes lambed (65 vs 45%; $P < 0.01$). Pregnancy retention rate averaged 84.6 ± 1.7% for both service periods and tended to be higher in ewes conceiving at the first service period (87.6 ± 2.0%) than at the second service period (80.4 ± 2.8%; $P = 0.07$). FSH-treated ewes tended to have higher prolificacy (1.67 ± 0.1) than ewes receiving progesterone alone (1.5 ± 0.1; $P = 0.06$) and than ewes lambing to the second service period (1.5 ± 0.1; $P = 0.06$). It was concluded that a 5-d progesterone pre-treatment of anestrous ewes induced estrous cycles and increased the pregnancy and lambing rates. A single injection of FSH only tended to increase prolificacy and lambing rate.

Even with the success rates obtained in out-of-season breeding, it is necessary to breed those ewes that do not conceive out-of-season during the regular fall season to maximize overall profitability. Success can be improved by genetic selection for the ability to breed out-of-season. Dr. Dave Notter at Virginia Tech has improved the proportion of ewes lambing after being exposed to rams in May from 50-60% to over 85% in just five generations. We are using rams from Dr. Notter's selected flock in several of the cooperating flocks in the project. As their daughters enter the flocks we expect pregnancy rates to out-of-season breeding to increase accordingly (Table 4).

Pregnancy and lambing rates to first service were very high in ewes bred at synchronized estrus in the fall. A five-day treatment with progesterone in combination with injection of prostaglandin at withdrawal of progesterone appears very promising (Table 5).

Supporting Reproductive Services

Both interest in and demand for reproductive management services have increased among West Virginia Sheep Improvement Project cooperators and other producers. The project staff has conducted numerous clinics for breeding soundness exams in 1999 and 2000. Pregnancy testing by ultrasonography is a valuable management tool because early identification of non-pregnant ewes can reduce feed costs and other expenses associated with non-productive females. Staging gestation and identifying single versus multiple bearing ewes allows them to be fed to meet their specific nutritional needs, which not only controls feed costs, but also helps prevent problems and expenses associated with pregnancy toxemia.

Predator Control

The coyote control program, operated by USDA Wildlife Service and directed by William Bonwell, removed 206 coyotes in FY 2000 (0ct 99 to Sept 00) compared to 146 in 1999 and 89 in 1998, indicating that the predator threat has not subsided. However, losses of sheep to coyotes on cooperating farms in the project totaled 26 head in 1999 compared to 48 head in 1998. In fall-lambing flocks, losses were calculated at 2.4% in 1998 and 2.9% in 1999, compared to 4.4 and 6.2%, respectively in spring-lambing flocks. Thus fall lambing appears to be helping to reduce predator losses.

Profitability

Based on analyses of costs and returns by Dee Singh, profitability from fall lambing has exceeded that from spring lambing by about $4.00 per ewe (Tables 6 and 7). The cost data obtained from flocks using out-of-season breeding compared to conventional fall breeding during the first year of the project showed increased feed costs for the lambs from out-of-season breeding and a wide variation from farm to farm in the amounts of hay fed per ewe. As replacement ewes born in fall are saved in the flocks and as nutritional costs are controlled, profitability can be expected to increase. Cooperators are enthusiastic about the project and have made extra efforts to help with project activities, including sharing labor, purchasing extra rams and requesting information on new strategies for expansion of sheep enterprises.

Summary

Out-of-season breeding has potential to contribute to a renaissance in the sheep industry in the Eastern United States. Conception rates for ewes that are induced to show estrus in late spring are essentially normal, but not all ewes show estrus in response to ram introduction or progesterone pretreatment followed by ram introduction. Proportions of ewes lambing are limited by the proportion that fail to show estrus and by the proportion that fail to retain pregnancy. The proportion of ewes that exhibit estrus and become pregnant in response to ram introduction can be improved by selection. Other factors that limit profitability include the fact that ovulation rate may be lower and individual embryos or fetuses may be lost by pregnant ewes. In addition, some producers have overfed fall-lambing ewes or fed in such a manner that feed wastage reduced profit. Current breed types in typical Appalachian flocks can be expected to lamb at rates of 40 to 45% to first service and 60 to 65% after two services in response to progesterone pretreatment and ram introduction, with about 1.5 lambs per ewe lambing. However, purebred ewes of breeds known for shorter breeding seasons will perform less well in such systems.

Table 1. Distribution and some reproductive characteristics of ewes by farm and face color in 1998 out-of-season breeding study.

	No. of Ewes Per Face Color/Breed Type[a]					PR First service (%)[b]	Ewes Lambing (%)[c]	Prolificacy[d]
Variable	Tot	B	M	W	Ch			
Farm:								
JH	52	9	15	28	0	40	52	1.7
WA	47	33	8	6	0	40	87	1.8
GF	75	60	14	1	0	44	72	1.7
SP	34	13	8	3	10	21	24	1.4
RR	15	15	0	0	0	60	47	1
HE	67	51	11	4	1	16	43	1.5
Face Color:								
Black (B)			181			43	59	1.6
Mottled (M)			56			49	61	1.8
White (W)			42			60	69	1.6
Cheviot (Ch)			11			0	0	-

[a] The only breed identified specifically was North Country Cheviot(Ch). Black-faced ewes (B) on farm RR were 100% Suffolk, but other black-faced ewes were grade and included Hampshire and Suffolk breeding. White-faced ewes (W) included Dorset and other breeding. Mottled-faced ewes (M) included crosses of black- and white-faced ewes.

[b] PR-pregnancy rate, number of ewes pregnant on d 26 to 31 as a percentage of all ewes in groups treated with progesterone.

[c] Ewes lambing to first or second service period of all ewes exposed and alive at lambing.

[d] Lambs born per ewe lambing.

Table 2. Reproductive performance of anestrous ewes in response to ram introduction (C), or ram introduction + 12-d progesterone pre-treatment (P12), 12-d progesterone pre-treatment + FSH (P12F) or 5-d progesterone pre-treatment +FSH (P5F).

Variable	Treatment			
	C	P12	P12F	P5F
Number of ewes	73	73	71	77
Ewes marked by rams (%)[c]	9 (12)[a]	56 (77)	47 (66)[b]	61 (79)
Ram introduction to raddle marks, h	56 ± 0.6[a]	42 ± 0.2	40 ± 0.2	43 ± 0.2
Pregnancy rate to first service (%)[c,d]	1[a]	48	42	47
Conception rate to first service (%)[c,e]	10[a]	63	64	56
Pregnancy rate 2nd service period (%)[f]	50	63	56	61
Ovulation rate[g]	-	1.9 ± 0.1	2.2 ± 0.2	2.2 ± 0.2
Ewes lambing[c]:				
(a) From 1st service period (%)	0[a]	45	39	42
(b) Both service periods, %	41[a]	66	64	63
Prolificacy[h], mean ± SE:				
(a) Lambing to 1st service period	-	1.6 ± 0.1	1.9 ± 0.1	1.8 ± 0.1
(b) Lambing to both service periods	1.5 ± 0.1	1.5 ± 0.1	1.6 ± 0.1	1.8 ± 0.1
Ram introduction to lambing, d	165 ± 2[a]	152 ± 1	153 ± 1	153 ± 1

[a] Progesterone vs control, $P < 0.01$, [b] P12F vs P5F, $P < 0.05$.
[c] Three ewes in P5F and one in the C treatment groups that were detected pregnant at the first pregnancy diagnosis were not detected in heat. Two ewes in C and one each in P12F and P5F were removed because of death or lost ear tags before lambing.
[d] Number of ewes diagnosed pregnant on d 26 to 31 as a percentage of all ewes in a treatment group.
[e] Number of ewes diagnosed pregnant on d 26 to 31 as a percentage of ewes marked by rams.
[f] Number of ewes pregnant on d 46 to 51 expressed as a percentage of ewes not pregnant on d 26 to 31.
[g] Number of CL observed in ewes diagnosed pregnant on d 26 to 31.
[h] Lambs born per ewe lambing.

Table 3. Summary of reproductive performance of anestrous ewes in response to ram introduction (C), or ram introduction + 5-d CIDR pre-treatment without (P5) or with FSH (P5F).

Variable/Treatment	C	P5	P5F
Number of ewes	125	257	271
Ewes in estrus[1], %	20	75 [a]	79 [a]
Ovulation rate	-	1.95 ± .1	1.96 ± .1
Conception rate[2], %	0	70 [a]	66[a]
Pregnancy rate, %			
First service period[3]	0	53 [a]	52 [a]
Second service period[4]	57	45	54
Percent ewes lambing, %			
First service period	0	46[a]	46[a]
Both service periods	45	63[a]	67[a]
Prolificacy[6] (mean ± SE)			
First service period	-	1.50 ± .1	1.67 ± .1
Second service period	1.52 ± .1	1.47± .1	1.47 ± .1
Overall	1.52 ± .1	1.49 ± .1	1.60 ± .1

[a] ($P < .01$), [b] ($P < .05$) values in same row without common superscript differ.
[1] Number of ewes marked by raddled rams as a percentage of all ewes treated.
[2]Number of ewes diagnosed pregnant on d 26 - 31 as a percentage of ewes exhibiting estrus.
[3]Number of ewes diagnosed pregnant on d 26 - 31 as a percentage of all ewes treated.
[4]Number of ewes pregnant on d 46 – 51 expressed as a percentage of ewes not pregnant on d 26 – 31.
[5]Lambs born per ewe exposed.
[6]Lambs born per ewe lambing. First service period ($P = 0.06$).

Table 4.

POTENTIALS OF MANAGEMENT SYSTEMS FOR OUT-OF-SEASON LAMB PRODUCTION

TREATMENT OR SYSTEM	EXPECTED % EWES LAMBING
Leave rams with ewes all year	0 – 15% in 3 months
Introduce rams in May or June (1:12-15)	40 – 60% in 40 – 45 days[1]
Inject 25 mg progesterone at ram introduction	45 – 60% in 35 – 40 days[1]
Inject progesterone, introduce rams, inject prostaglandin $F_2\alpha$ day 14 – 16	45 – 65% in 35 – 40 days[1]
Intravaginal progesterone (CIDR) 5 days, then introduce rams	45 – 65% in 25 – 30 days[1]
Select for ability to breed in May (Notter)	80 – 85% in 45 - 60 days[1]
Inject progesterone, introduce rams, inject prostaglandin in selected ewes	80 – 85% in 35 – 40 days[1]
Intravaginal progesterone (CIDR) 5 days in selected ewes, then introduce rams	80 – 85% in 25 – 30 days[1]

[1] Days for completion of lambing from two service periods from ram introduction.

Table 5. Summary of performance of ewes synchronized by prostaglandin $F_2\alpha$ or progesterone plus prostaglandin $F_2\alpha$ for fall breeding.

Group	PG	CIDR/PG
Number of ewes[1]	81	83
Ewes in Estrus (%)[2]	62	84
First Service Period:		
At pregnancy diagnosis		
Conception rate (%)[3]	72	77
Pregnancy rate (%)[4]	44	62
At lambing		
Conception rate (%)[5]	70	69
Pregnancy rate (%)[6]	43	58
Overall Pregnancy rate (%)[7]	88	80
Prolificacy		
First service period[8]	1.83	1.65
Overall[9]	1.84	1.64

[1] Number of ewes assigned to treatment groups.
[2] Ewes detected in heat by 72h after ram introduction as a percent of all ewes exposed.
[3] Ewes pregnant on d 25 as a percentage of ewes detected in heat.
[4] Ewes pregnant on d 25 as a percentage of all ewes exposed for two service periods.
[5] Ewes lambing by d 153 after ram introduction as a percentage of ewes detected in heat.
[6] Ewes lambing by d 153 after ram introduction as a percentage of ewes with an opportunity to lamb.
[7] Ewes lambing as a percentage of ewes with an opportunity to lamb to two service periods.
[8] Lambs born per ewe lambing by d 153.
[9] Lambs born per ewe lambing to two service periods.

Table 6. Comparison of Fall And Spring Lambing

VARIABLES	FALL LAMBING	SPRING LAMBING
Lbs. Of Hay/Ewe	830 Lbs	796 Lbs
Cost of Hay/Ewe	$30.19	$27.36
Amt. Of Mineral/Ewe	4.6 Lbs	6.8 Lbs
Mineral Cost/Ewe	$1.02	$1.82
Amt. Of Ewe Grain/Ewe	330 Lbs*	159 Lbs*
Ewe Grain Cost/Ewe	$24.34*	$12.13*
Amt. of Lamb Grain/Lamb	91 Lbs	103 Lbs
Lamb Grain Cost/Lamb Sold	$7.51	$11.95
Pasture Cost/Ewe	$2.25	$2.54
Vet & Med Cost/Ewe	$2.58*	$5.18*
Total Cost/Ewe	$69.69*	$62.89*
Total Feed Cost/Ewe	$67.11*	$57.71*
Total Ewe Feed Cost/Ewe	$57.80*	$42.05*
Total Lamb Feed Cost/No. of Lambs	$8.02	$12.36

Table 7.

VARIABLES	FALL LAMBING	SPRING LAMBING
Cost/Lb of Lamb Produced	$0.58	$0.51
Profit/Ewe	$43.17	$39.01
Profit/Lb. of Lamb Produced	$0.33	$0.28
Lambing Crop (Lamb/Ewe Lambing)	159%*	170%*
Fertility (Ewe Exposed that Lambed)	75%*	89%*
Mortality	6%*	10%*
Average Mkt. Wgt/Lamb	96 Lbs	97 Lbs
Mkt. Price/Lb. of Lamb	$0.93*	$0.75*
Average No. of Days Lambs Kept	162 Days	185 Days
Average Lbs of Lamb Sold	13150 Lbs	10868 Lbs
Break-Even Price	$0.58	$0.51
Break-Even Yield	8880 Lbs	7429 Lbs

Appendix 1 - Inskeep
Eastern Sheep Research, Education and Development Center

Location - West Virginia University, Morgantown, WV and Virginia Tech University, Blacksburg, VA, with collaboration from The Ohio State University and Virginia State University.

Primary Mission - To create and establish an Eastern Sheep Research, Education, and Development Center whose primary mission is to increase the efficiency and profitability of sheep production and the economic stability of small independent farmers in West Virginia, Virginia, and the surrounding region. To enable and encourage farmers in the Appalachian Region to become *active participants and leaders* in reshaping and rebuilding the U.S. sheep industry and to help them improve the competitive position of the U.S. sheep industry in a global marketplace.

Timeliness - In response to a successful section 201 trade case, nationally, the sheep industry has been given a unique opportunity for growth and development, as well as a mandate for change. The sheep industry's ultimate success or failure at improving its competitive position during the three-year period of relief granted by President Clinton, depends immeasurably on the success of individual farmers in improving the biologic and economic efficiency of their operations and on their ability to respond to consumer preferences and to industry signals in an informed, timely, and cost-effective manner.

Objectives

1. Implement proven reproductive management programs that contribute to the development of a consistent year-round supply of lamb and capitalize on established seasonal market incentives.
2. Develop and disseminate germplasm for "easy-care" sheep that will increase production efficiency, allow sheep to be managed under less intensive conditions, and reduce costs associated with management, labor, and housing, and with preventative, therapeutic, and reproductive pharmaceuticals.
3. Expand performance testing and genetic evaluation programs. Utilize artificial insemination and embryo transfer technology to make superior genetics available to more producers.
4. Develop and implement cost-effective forage and nutritional management systems that improve forage quality/availability, utilize alternative feeds, and enhance the environment.
5. Introduce extensive management production systems that emphasize optimum production and lower per-unit production costs.
6. Assist farmers with overcoming barriers to profitable sheep production such as using guardian animals in effective predator control strategies.
7. Develop a new strategy for marketing sheep and expand the VA/WV coordinated graded lamb marketing program. Develop, implement, and negotiate forward deliverable contracts for feeder/slaughter lambs to decrease risk exposure and to facilitate planning, budget development and analysis.
8. Assist farmers with integrated farm planning and conduct training on unit costs of production.

Benchmark Goals for Economic Development

1. Increase breeding sheep numbers 5% per year.
2. Increase pounds of lamb marketed 10% per year.
3. Reduce losses to predation 6% per year.
4. Increase net farm income of operations with sheep 2% per year.
5. Increase number of farms operations with sheep 2% per year.
6. Train 250 farmers per year in improved management techniques.

SHEEP VACCINES AND VACCINATION SCHEDULE

Dr. Kevin D. Pelzer
VA-MD Regional College of Veterinary Medicine

1. Prebreeding – 3 weeks prior to ram introduction
   A) Campylobacter (Vibrio) – may make ewes sore for a couple of days, is boostered 60 to 90 days later.
   B) Chlamydia – usually in with the Campylobacter, has not been consistently on the market.
   C) Ewe lambs would be vaccinated 6 weeks and 3 weeks prior to introduction of rams.

2. Prelambing – bag ewes and vaccinate 3 weeks prior to lambing
   A) Clostridium perfringens C and D, tetanus
   B) Intranasal Parainfluenza – Nasalgen, squirt 1 ml up one nostril.

3. Preweaning – 2-3 weeks prior to weaning
   A) Clostridium perfringens C and D, tetanus

4. Weaning
   A) Clostridium perfringens C and D, tetanus

5. Replacement ewes approximately 6 weeks prior to breeding
   A) Campylobacter and Chlamydia
   B) 8-way clostridial vaccine – optional, this vaccine causes knots
   C) Orf vaccine – use if orf (contagious ecthyma) is a problem

6. Lambs at the time of castration and docking
   A) Clostridium perfringens C and D , tetanus
   B) If ewes have not been vaccinated with tetanus prior to lambing, lambs should receive 300 IU of tetanus antitoxin as well as the vaccine. Do not mix the antitoxin and vaccine in the same syringe.

7. Foot rot vaccine
   A) Give prior to time of the year when foot rot is a problem. Usually it is during the rainy/wet seasons but may vary on individual farms.

Campylobacter (Vibrio)

Campylobacter is a bacterium that causes abortion in ewes. The organism is harbored by carrier sheep in the gall bladder and intestinal tract. Infection usually occurs through oral ingestion of the organism. Sources of contamination are feces, aborted fetuses, placenta, and fetal fluids or vaginal discharge. The bacterium infects the placenta and the fetus causing abortion. The organism usually causes abortions during the second half of gestation. Ewes are not sick but may have diarrhea.

Chlamydia

Chlamydia is a bacterium that causes abortion in ewes. The organism is shed in aborted fetuses, placenta, and vaginal fluids. Oral and conjunctival contact with infected fluids is the major route of infection. The organism infects the placenta and the fetus. Ewes may be off feed and have a fever prior to aborting but often times these clinical signs are overlooked. Ewes that abort have immunity for the next 3 years. This vaccine comes on and off the market. One study indicated that there was no real benefit in vaccinating.

Clostridium perfringens C and D

Clostridium perfringens is a bacterial disease that causes sudden death in lambs. This is the organism that causes the classic overeating disease and is the most common cause of hemorrhagic diarrhea in lambs less than a week of age. As a result then, the animal needs to be protected during the first week of life and then around the time of weaning. To protect the lamb at birth, the ewe is vaccinated prior to lambing so antibodies to the organism are present in the colostrum. The lambs are then vaccinated prior to and at the time of weaning. This vaccine is cheap and often contains tetanus.

Clostridium tetani

Clostridium tetani is a bacterial disease that causes tetanus. The organism can not live in the presence of air. Therefore, it is a disease that occurs when there has been an injury or a puncture wound. The organism remains in the soil for a long time and is shed in horse feces. Ewes and their lambs then are likely exposed when housed in barns that have previously been used to house horses. Sheep are very susceptible to tetanus. Since the organism prefers traumatized tissue, tail docking, castration, shearing, and lambing are times. To protect the lamb at birth, the ewe is vaccinated prior to lambing so antibodies to the organism are present in the colostrum. The lambs are vaccinated at the time of castration or docking and again around the time of weaning as the C and D vaccine often times contains tetanus.

Other Clostridium organisms

The 8-way clostridial vaccine contains Cl. chauvoei, Cl. septicum, Cl. hemolyticum, Cl. novyi, Cl. tetani, Cl. perfringens C and D. Cl. chauvoei and septicum cause blackleg and malignant edema. Cl. hemolyticum and novyi cause disease with in the liver and are often associated with liver flukes. In my experience, it is rare for sheep to acquire these infection. The vaccine tends to be fairly reactive causing the sheep to be stiff and sore for a day or 2 after vaccination. This vaccine also leaves some scar tissue. Because of the side effects of this vaccine and the rarity of the diseases it protects, I do not include it in my vaccine schedules.

Parainfluenza

Parainfluenza is a virus that causes upper respiratory disease predisposing the sheep to pneumonia. A cattle product is used. Infectious bovine respiratory virus (IBRV) is included in the vaccine with the parainfluenza virus although IBRV does not cause disease in sheep. The vaccine is a intranasal vaccine. The reason the vaccine is given in the nose is to provide for local immunity within the nasal passages. This is where the virus infects the sheep. The dose on the bottle is 1 ml of vaccine is 1 ml per nostril. Good protection is obtained by squirting 1 ml up one nostril in sheep.

NUTRITIONAL MANAGEMENT OF THE EWE FLOCK

Pete Martens and Rodney Leech, PD 6 Animal Science Agents

Nutritional management of the ewe flock is simply using the most economic available feed that provides the needed nutrient requirements of the ewes. During the growing season, this is most likely met with standing forages. When grasses become short or go dormant, then harvested forage and feed are the main diet of our ewe flocks. Harvested hay is usually the most economic feed and provides the bulk of the flocks nutrition during the winter feeding period. Often grass hay will need to be supplemented to adequately meet the ewes nutritional needs, especially if the ewes are in late gestation or nursing lambs.

The first and perhaps the most important step of determining your flock's nutritional needs is to find out the nutritional value of your feed. If you are using a purchased bag feed, this information can be found on the feed tag. Most grains such as corn are very consistent in terms of nutritional value. Forages, however, will vary depending on stage of maturity when harvested, storage, and exposure to air or moisture. It is very important that forages are tested every time there is an expected change in quality or nutritional value.

Testing feeds for nutrient content gives sheep producers a management tool to help them maintain adequate and economic feeding programs. The results will enable producers to balance rations and reduce feed costs. The most accurate method for sampling hay is to use a "core sampler" which is available for loan at most Extension Offices. Silage and concentrates can be sampled by taking a well-mixed composite of the feed and sending it in an airtight plastic bag.

Sample small bales of hay from the end of the bale. Drill hay to the full depth of the "sampler" tube. Take samples from 10-15 different bales, preferably from the same harvest date and composite into one sample. Sample every fourth or fifth bale in a lot. Round bales should be core sampled from two locations in five different bales. If the outer layer of hay has weathered, pull away the outer 1 to 2 inches and sample below the weathered portion.

Package the forage sample and accompanying forms according to lab procedures and remember the 10 steps for submitting a sample.

1. Use a fresh sample.
2. Use proper sampling method.
3. Mix sample well.
4. Fill in Lab I.D. form completely.
5. Keep a record of what was submitted and when.
6. Submit the correct amount of sample.
7. Place in plastic bag, remove air, seal.

8. Attach Lab I.D. form.
9. Pack in box.
10. Submit samples to Forage Testing Laboratory.

Now that you have received you hay forage analysis results the next step will be utilized these results in determining if the hay will meet the nutrient requirements of your ewe flock!

An example of a hay forage analysis is located on the following page (Sample Form A). Please note that the significant information needed by sheep producers to determine the nutrients contained in the hay are identified as follows:

(A) = Dry matter (DM), B = Crude Protein (CP), and C = Total Digestible Nutrients (TDN which relates to feed energy levels).

Since we figure nutrient value of feeds for sheep on a Dry Matter basis we then must figure the dry matter is one pound of hay.

Using the sample form the dry matter in one pound of hay is: 1# x .8894 DM = .8894# DM/# of hay.

Then we can determine the amount of Crude Protein and TDN per pound of dry matter as follows:

Form A: CP (Crude Protein) = 15.98% (CP) x .8894 # (DM) = .14# CP/# hay

Form A: TDN (Total Digestible Nutrients) = 66.36% = .6636 (TDN) x .8894# (DM) = .59# TDN/# hay

Using the forage results along with the nutrient requirements of the ewe we can balance a ration.

Here are two examples utilizing the Sample **Form A** hay:

EXAMPLE 1:

155 pound ewe, in early gestation, nutrient requirements* are:

DM Consumption = 3.1 pounds
CP Requirements = .29 pounds
TDN Requirements = 1.7 pounds

Using these requirements let's see if our hay will meet the ewe's needs:

The ewe consumes 3.1 pounds of the hay on a dry matter basis which provides the following:

3.1# x .14# (pounds of CP/# of DM hay) = .43# of CP consumed
3.1# x .59# (pounds of TDN/# of DM hay) = 1.83# of TDN consumed

Note that both the protein need of .29# and TDN need of 1.7# have been exceeded by the hay alone!

Now, let's use this same hay in the late gestation and see wether of not the hay will meet the ewe requirements!

EXAMPLE 2:

155 pound ewe in late gestation nutrient requirements* are:

DM Consumption = 4.0 pounds
CP Requirement = .47 pounds
TDN Requirement = 2.8 pounds

Using these ewe requirements will the hay alone meet the protein and TDN needs? Let's see!

4.2# DM Consumption of the ewe
4.2# x .14# (pounds of CO/pound of hay) = .59# CP consumed
4.2# x .59# (pounds of TDN/pound of hay) = 2.5# TDN consumed

We can now see that 4 pounds of this high quality grass hay **would** supply enough **protein** for this ewe (she needs .47 pounds, the hay supplies .56 pounds).

However, it does **not** supply enough TDN for the ewe (she needs 2.8 pounds, the hay supplies only 2.36 pounds!).

In order to meet the ewe's TDN needs a ration including a grain supplement must be developed. Dr. Scott Greiner's proceedings article on **Ewe Nutrition** provides further information on ewe requirements that will help producers provide and concentrate values their ewe flock with a balanced ration.

*Values adopted from National Research Council for Sheep, 6th Ed.

Labno:	877
Date Received:	27-Oct-99
Date Mailed:	02-Nov-99
Sample Type:	MH 15070

Virginia Tech Forage Testing Lab
320 Litton-Reaves Hall (0315)
Blacksburg, VA 24061
(540) 231-6870

Date Sampled: 27-Oct-99

Description: P3 Mixed Alf/Grass

Fax:

		Dry Basis	As Fed Basis	Index	High Quality	Average Quality	Low Quality
A➡ Dry Matter	%	89.79					
B➡ Crude Protein	%	13.42	12.05	88			
Digestible Protein	%	8.95	8.03				
Soluble Protein	%						
Acid Detergent Fiber (ADF)	%	40.92	36.74				
Neutral Detergent Fiber (NDF)	%						
C➡ TDN (Estimated)	%	59.55	53.47	100			
ENE	T/100 lb.	59.76	53.66				
NE Lactation	Mcal/lb.	.59	.53				
NE Maintenance	Mcal/lb.	.59	.53				
NE Gain	Mcal/lb.	.33	.30				
Nitrates	%						
Fat (Ether Extract)	%						
Lignin	%						

Comments:

Proper sampling technique and sample identification are critical to assure representative analytical results for your feedstuffs!

For more information, check the Forage Lab website at: http://www.dasc.vt.edu/forage

Duplicate Copy to:

EWE NUTRITION

Scott P. Greiner, Ph.D.
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Ewe nutrition is a very important aspect of total flock management. Proper nutrition of the ewe is necessary to optimize productivity. Feed costs are the largest single cost of maintaining ewes and must be controlled for the flock to perform at an economical level.

There are several factors that affect the nutritional needs of the ewe, the primary factors include: 1) age, 2) size, 3) body condition, and 4) stage of production (maintenance, gestation, or lactation). Additionally, health status (including parasite load), weather, activity level, and other environmental factors may also influence nutritional requirements and management. However, the answers to such questions as Is the ewe pregnant? If so, which stage of pregnancy is she in? If lactating, how many lambs is she nursing? When will the lambs be weaned? should provide the shepherd the information necessary to make decisions relative to nutritional management.

To determine when and how much to feed the flock, we must know the animals' requirements. These requirements are affected by size (body weight) and stage of production, and are found in Table 1. The remaining portion of this paper will examine these stages of production. For the purpose of this discussion, we will assume a ewe body weight of 175 pounds.

Maintenance

The animal's requirements for maintenance are the amounts of dietary nutrients it must consume daily to neither gain or lose weight. Maintenance is generally associated with the dry period, or period between weaning and the breeding season. Maintenance requirements for three weights of ewes are found in Table 1. These weights are to be reflective of pre-breeding weights for ewes in average body condition. The measure of energy that will be used in this paper is Total Digestible Nutrients (TDN). A 175 lb. ewe has a maintenance requirement of 2.9 lb. TDN/day, and maintenance protein requirement of .25 lb./day. Normally, ewes would be grazing pastures during this stage of production and would have no trouble meeting these requirements. In fact, during spring and early summer, grazing lush pastures would allow the ewe to far exceed their maintenance requirement and result in some weight gain. This weight gain is desired and necessary, since most ewes will lose body condition during lactation.

Flushing

Flushing is the practice of increasing energy intake, and therefore body condition, during the 10-14 prior to breeding. This practice has been shown to be effective in increasing ovulation rates, and thereby increasing lambing percentage by 10-20%. The response to flushing is affected by several factors, including the body condition of the ewe. Ewes that are in poor body condition will respond most favorably to the increase in energy, whereas fat ewes will show little if any response. With ewes on pasture, flushing is most easily accomplished through providing .75 to 1.25 lb. corn or barley per head per day from 2 weeks pre-breeding through 4 weeks into the breeding season. Since corn

grain is approximately 80% TDN, providing 1 lb./day would provide .8 lb. of additional energy to the ewe (1 lb. corn x 80% TDN = .8 lb. TDN). This additional energy would approach the additional energy requirement shown in Table 1. Flushing should not continue for an excessively long period, as overfeeding is costly. Additionally, ewes that become very fat and then are placed on a lower plane of nutrition following flushing may be subject to increased prenatal mortality and lower lambing rates.

Early Gestation

Table 1 shows that there is a relatively small increase in ewe nutrient requirements for the first 15 weeks of gestation compared to maintenance. It is during this time that winter and spring-lambing ewes will make the transition from pasture to a diet of harvested feedstuffs. While on fall pastures, ewes should consume enough forage to meet their nutritional requirements during this early gestation stage. When feeding hay becomes necessary, it is important that the quality and quantity of hay being fed be closely considered. Assuming the available hay is 50% TDN and 12% crude protein on as as-fed basis, a 175 lb ewe eating 3.3 lbs/day of this hay would consume 1.7 lb TDN and .40 lb crude protein. The requirements for this ewe in Table 1 are 1.8 lb TDN and .31 lb protein daily. Note that her protein intake exceeds the requirement. Additionally, a ewe given the opportunity to consume as much of this hay as she desired would consume considerable more than 3.3 lb per day (ewes can consume 3.5% of their body weight), and easily meet her requirements. This emphasizes the importance of utilizing poorer to average quality hays during the early gestation period, when ewe nutrient requirements are low compared to late gestation and lactation. If high quality hays, such as alfalfa, are fed during this period it is important to limit intakes. Overfeeding during this period is costly, and may also result in over-conditioned ewes leading to complications later in the production cycle.

Late Gestation

Approximately 2/3 of the birth weight of a developing fetus is gained during the last six weeks of gestation. As a result, the nutritional requirement of the ewe for both energy and protein increases. Table 2 shows that TDN requirements increase to 57-66%, compared to 55% for maintenance and early gestation. Similarly, protein requirement increases to around 11% compared to 9% for maintenance. The most critical difference is the increase in energy requirement. Inadequate nutrition during this period may result in pregnancy ketosis, light birth weights, weak lambs, and lower milk production Supplementation of 1 to 2 lb. corn/ewe/day, in combination with average to good quality hay (> 11% CP) should provide adequate nutrition. An important consideration during this period is the number of fetuses the ewes are carrying (see Table 1). As the ewes approach lambing, the size of the uterus increases and limits intake. Therefore, feeding nutrient-dense rations in important to ensure adequate nutrition. Although corn silage is an excellent feed for sheep, its high moisture content and bulkiness prevents it from being the sole roughage source during late gestation. Additionally, corn silage is low in protein and calcium and requires additional sources of these nutrients be added to the diet for balanced nutrition.

Lactation

Growth rate of lambs from birth to weaning is largely determined by milk production of the ewe, which emphasizes the importance for good nutritional management during this period. Lactation is also a period in which there is opportunity to control feed costs by feeding ewes according to the number of lambs nursing. During lactation, the ewe's nutritional requirements for both energy and protein increase significantly compared to gestation. As mentioned previously, the highest quality hays should be utilized during this time. Alfalfa hay is an excellent feedstuff during lactation due to its relatively high energy and protein density relative to other forages. In most cases, a grain-protein supplement (such as corn-soybean meal) will also need to be fed in addition to the highest quality hay available. The needed protein content of this grain mix will vary depending on quality of the hay utilized. Generally, total rations should be formulated to contain 70% TDN and 14% protein for lactation. Table 1 demonstrates the significant differences in nutrient requirements of ewes nursing single vs. twins vs. triplets. Splitting ewes by number of lambs nursing is an excellent management technique to minimize feed costs. Ewes rearing single lambs will require less grain supplementation than twin-rearing ewes. Similarly, triplet-rearing ewes could be provided the extra nutrition needed, if separated from other ewes. When all ewes are fed together, single-rearing ewes are likely being overfed which can be costly. Of course, facilities and labor will dictate feasibility of this management practice. As mentioned previously, mild production of the ewe is influenced by nutrition. Research conducted at Michigan State University by Dr. Margaret Benson showed that feed intake was the most important nutritional factor affecting milk production. Therefore, diets that are nutrient-dense and highly palatable will enhance milk production.

Ewe Lambs

Ewe lambs require special nutritional consideration during all stages of production. In addition to the requirements for pregnancy and lactation, ewe lambs also require additional nutrition as they have not yet reached mature body size and are still growing. Daily nutrient requirements of ewe lambs are presented in Table 3. Since ewe lambs are frequently managed as a separate group from the mature ewes, providing extra nutrition during gestation is easily attainable. Maintaining ewe lambs as a separate management group during lactation is also critical. This is especially important for ewe lambs nursing multiple births so they can receive proper nutrition to maintain adequate body condition for future growth and productivity.

Monitoring Body Condition

Body condition of the ewe is an important consideration in nutritional management. If ewes are getting fat, they are consuming more energy than they need, and are likely being overfed. On the other hand, if they are thin, they are not receiving adequate energy intake. Table 1 lists requirements for ewes in average body condition, and may be above or below the requirements for your flock. Proper body condition is essential for optimum productivity, and is most critical during the breeding season and late gestation. Ewes that need to improve body condition should be separated from the rest of the flock, and supplemented.

Forage Quality

An important aspect of nutritional management is knowing the quality of forages that will be utilized, most importantly hay. To properly balance rations and formulate diets, an accurate forage analysis should be conducted on all harvested feeds (hays and silage). There can be significant variation in hays harvested from the same field from one year to the next, and from one cutting to another. Having accurate feed analysis will may save feed costs and will certainly improve the ability to adequately manage the nutrition of the flock.

In summary, ewe flock nutrition is an important aspect of the profitability of the sheep enterprise. Efforts to provide adequate, cost-effective nutrition can be simplified when ewes are fed specifically for stage of production.

Table 1. Daily Nutrient Requirements of Mature Ewes[a]

Stage of Production	Body Wt. (lb.)	Wt. gain or loss (lb.)	DM intake/day[b] (lb.)	Energy TDN (lb.)	Protein (lb.)	Ca (g)	P (g)	Vit. A (IU)	Vit. D (IU)	Vit. E (IU)
Maintenance	150	.02	2.6	1.5	.25	2.5	2.4	3290	378	18
	175	.02	2.9	1.6	.27	2.7	2.8	3760	441	20
	200	.02	3.1	1.7	.29	2.9	3.1	4230	505	22
Flushing	150	.22	4.0	2.3	.36	5.7	3.2	3290	378	27
(2 wk. prebreeding &	175	.22	4.2	2.5	.38	5.9	3.6	3760	441	28
1st 4 wk. breeding)	200	.22	4.4	2.6	.39	6.1	3.9	4230	505	29
1st 15 wk. gestation	150	.07	3.1	1.7	.29	3.5	2.9	3290	378	21
	175	.07	3.3	1.8	.31	3.8	3.3	3760	441	22
	200	.07	3.5	1.9	.33	4.1	3.6	4230	505	24
Last 4 wk. gestation	150	.40	4.0	2.3	.42	6.2	5.6	5950	378	27
(130-150% lamb crop)	175	.40	4.2	2.4	.44	6.3	6.1	6800	441	28
	200	.40	4.4	2.5	.77	6.4	6.5	7650	505	30
(180-225% lamb crop)	150	.50	4.2	2.8	.47	7.6	4.5	5950	378	28
	175	.50	4.4	2.9	.49	8.3	5.1	6800	441	30
	200	.50	4.6	3.0	.51	8.9	5.7	7650	505	32
Lactation (1st 8 wk.)	150	-.06	5.5	3.6	.73	9.3	7.0	5950	378	38
Nursing single	175	-.06	5.7	3.7	.76	9.5	7.4	6800	441	39
	200	-.06	5.9	3.8	.78	9.6	7.8	7650	505	40
Nursing twins	150	-.13	6.2	4.4	.94	11.2	8.4	7000	378	42
	175	-.13	6.6	4.7	.98	11.4	8.8	8000	441	45
	200	-.13	7.0	5.0	1.01	11.6	9.2	9000	505	48
Nursing triplets	150	-.20	6.5	4.9	1.04	12.2	9.0	8000	378	47
	175	-.20	7.2	5.2	1.08	12.4	9.4	9000	441	50
	200	-.20	8.0	5.5	1.11	12.6	9.6	10,000	505	53

[a]Values adopted from National Research Council for Sheep, 6th Ed.
[b]To convert dry matter to an as-fed basis, divide by percent dry matter.

Table 2. Daily Nutrient Concentrations in Diets for Mature Ewes[a] (175 lb. body weight)

Stage of Production	DM intake/day[b] (lb.)	Energy TDN (%)	Protein (%)	Ca (%)	P (%)
Maintenance	2.9	55	9.3	.19	.21
Flushing	4.2	60	9.0	.31	.19
1st 15 wk. gestation	3.3	55	9.4	.25	.21
Last 4 wk. gestation					
(130-150% lamb crop)	4.2	57	10.5	.33	.32
(180-225% lamb crop)	4.4	66	11.1	.41	.25
Lactation (1st 8 wk.)					
Nursing single	5.7	65	13.3	.37	.28
Nursing twins	6.6	71	14.8	.38	.29
Nursing triplets	7.2	72	15.0	.38	.29

[a]Values adopted from National Research Council for Sheep, 6th Ed. Values converted from Table 1 by dividing requiremet by DM intake.
[b]To convert dry matter to an as-fed basis, divide by percent dry matter.

Table 3. Daily Nutrient Requirements of Ewe Lambs[a]

Stage of Production	Body Wt. (lb.)	Wt. gain or loss (lb.)	DM intake/day[b] (lb.)	Energy TDN (lb.)	Protein (lb.)	Ca (g)	P (g)	Vit. A (IU)	Vit. D (IU)	Vit. E (IU)
1st 15 wk. gestation	110	.30	3.3	1.9	.35	5.2	3.1	2350	277	22
	130	.30	3.5	2.0	.35	5.5	3.4	2820	333	24
	155	.28	3.7	2.2	.36	5.5	3.7	3290	389	26
Last 4 wk. gestation	110	.35	3.5	2.2	.42	6.3	3.4	4250	277	24
(100-120% lamb crop)	130	.35	3.7	2.4	.42	6.6	3.8	5100	333	26
	155	.33	4.0	2.5	.43	6.8	4.2	5950	389	27
(135-175% lamb crop)	110	.50	3.5	2.4	.45	7.8	3.9	4250	277	24
	130	.50	3.7	2.6	.46	8.1	4.3	5200	333	26
	155	.47	4.0	2.7	.46	8.2	4.7	5950	389	27
Lactation (1st 8 wk.)	110	-.10	4.6	3.3	.62	6.5	4.7	4250	277	32
Nursing single	130	-.10	5.1	3.6	.65	6.8	5.1	5200	333	34
	155	-.10	5.5	3.8	.68	7.1	5.6	5950	389	38
Nursing twins	110	-.22	5.1	3.7	.71	8.7	6.0	5000	277	34
	130	-.22	5.5	4.0	.74	9.0	6.4	6000	333	38
	155	-.22	6.0	4.3	.77	9.3	6.9	7000	389	40

[a]Values adopted from National Research Council for Sheep, 6th Ed.
[b]To convert dry matter to an as-fed basis, divide by percent dry matter.

BABY LAMB MANAGEMENT

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VA-Tech, Blacksburg, VA

Lambing season is the critical time when the sheep producer's skill, effort, and concern determine the success of the entire operation. Dozens of problems occur. Many, however, can be traced back to poor management, inadequate equipment or an indifferent attitude. Attention to small details and the willingness to go the extra mile in giving babies special treatment can pay big dividends.

Perhaps one of the most important and least stressed management tools available to sheep producers is observation. A complete knowledge of sheep production is useless if producers do not have the ability, or more frequently, do not take the time to recognize problems as they arise. A part of a producer's daily routine should include close observation of all ewes and lambs. It is surprising the number of things that can be seen by spending just a few minutes per day looking at your sheep. After a few producers come to know their sheep very well. They know how they normally act, move, play, eat, etc. Good producers know when sheep are not feeling well. This gives them a head start on identifying problems during lambing.

LAMBING FACILITIES

A new lamb is a 5-to-14 pound sopping wet baby that has left a warm, well nourished environment for a harsher life outside. Now it must initiate breathing and maintain body temperature. If producers can't provide the lamb with a suitable environment they should choose to lamb later when weather is warmer.

The facility components of a shed lambing system include: 1) an area for ewes about 1 to 3 weeks prior to lambing, 2) a drop pen for ewes within a week of lambing, 3) lambing jugs for newly born lambs until they are 24 to 72 hours old, 4) nursery pens for a few ewes and their lambs 24 hours to 3 days after lambing, and 5) mixing pens for ewes with lambs for ewes with lambs 3 to 30 days of age.

The need to lamb 100 ewes in a facility large enough for only 50 ewes is a common problem. However of 100 ewes, no more than about 35 will lamb per week.
Also, after the newborn lamb has dried off, has been fed, and has had the opportunity to adjust to a harsher environment, it can be moved to cooler and presumably less costly quarters.

Outside Lots

This should be a large outside lot that ewes can be kept in prior to lambing. This lot usually contains the ewes that are several weeks from lambing. Ewes closer to lambing are usually kept in a drop area close to the lambing shed. This lot should have access to a sheep working facility and the lambing shed.

Lambing Barn

A lambing barn does not have to be fancy nor does it require a new building. In most cases existing facilities can easily be converted into workable lambing barns.

The most common facilities used are unheated lambing barns. They protect the animal from rain, wind and snow and provide temperatures just higher than outside temperatures. In certain areas heated lambing facilities may be beneficial, with temperatures maintained at 35 to 45 degrees F. However, when heated barns are utilized proper ventilation is more critical. If ammonia can be smelled in the barn ventilation is inadequate.

Drop Area: A space to house ewes that are within a week of lambing during adverse weather will come in handy. This space usually only needs to be large enough to house about 35 to 50 % of the ewe flock. This area should be large enough to allow 12 to 14 square feet per ewe. As lambing progresses less ewes will be in this group. The size of this area can be reduced accordingly making room for mixing pens. Also by dividing the drop band into small groups of ewes (10 to 20 ewes per pen) it may be possible to avoid having a night lamber. If you are unable to house the drop band inside, a lamber should be on duty at all times during cold weather, as the lambs must be brought inside immediately after lambing.

Lambing Jugs: One lambing jug for every 7 to 10 ewes in the flock should be adequate. They should be at least 4 by 4 feet and preferably 5 by 5 feet. Ewes will usually remain in these jugs from 12 to 24 hours.

Nursery Pens: The first set of nursery or mixing pens that the ewes are placed in should be large enough (16 to 20 sq. feet per ewe and lambs) to hold about 5 to 7 ewes with their lambs. Ewes should remain in these pens another 24 to 48 hours, therefore, approximately two or three of these pens for every 100 ewes in the flock will be needed.

MANAGEMENT

Prelambing Shearing

It is desirable to shear ewes about two weeks prior to lambing. This will enable you to house more ewes in the same shed space. Also it is easier for the lambs to start suckling and encourages the ewes to seek shelter from cold and to take their newborn lambs with them.

Prelambing Deworming

In the northern United States a large percentage of the internal parasites undergo arrested development (hypobiosis) during the winter months. Be sure to use a dewormer that is effective against these arrested larvae. Around lambing something occurs to stimulate maturation of these larva to adults. The result is a periparturient rise in worm egg counts and the beginning of an internal parasite problem. Just before lambing is an ideal time to worm the ewes. However, make sure that the drug you are using is safe for pregnant ewes.

Lambs are born about 145 days after the rams are turned in with the ewes. Make sure you have purchased supplies and set up the lambing facilities well before lambing begins. Once lambing begins your time will be better spent looking after the sheep.

The Lambing

The lamber's role is to assist delivery when necessary and to see that the lambs survive. Shortly after lambing the lambs should be picked up and the ewe, along with her lambs, placed in a lambing jug. A high percentage of mismothering can occur in the drop pen and therefore it is essential that the lamber be very attentive. If the lambing area is only being checked periodically it is beneficial that ewes in the close-up ewes be divided into small groups.

Once the ewes and lambs have been brought in, the naval cord of the lambs should be clipped to a length of 2" and dipped in 7% tincture of iodine. Do not use a spray application of iodine; instead use a wide mouth jar and immerse the navel in iodine. This practice is considered "essential" for preventing losses from navel ill.

When the ewe and lambs are placed in the jug, a stream of colostrum should be milked from each teat in order to remove the wax-like plug in the teat canal. By doing this the lamb will be able to suckle with less difficulty.

This is a good time to assess the ewes milk production and make grafts if necessary. Shortly after the lamb is able to stand it should be assisted in suckling if it cannot do so itself. The value of colostrum within the first 2 hours of birth cannot be overemphasized. Antibodies developed by the ewe against infectious organism are transmitted through the colostrum to the lamb. These antibodies provide disease protection to the lamb for several weeks following birth. Without early absorption of these colostral antibodies, the lamb is susceptible to disease. The production of and the ability of the lamb to utilize colostral antibodies decreases dramatically shortly after birth.

If the lamb is weak, the best way to save its life is to stomach tube the lamb 4-6 oz of colostrum. To keep a source of colostrum on hand "steal" some from other ewes (cow colostrum from cow's 1st milking is next best). A lamb needs about 10 % of its body weight of colostrum to receive adequate antibody protection. 5% should be given in the first 4 hours of life. Example: for a 10-lb. lamb 10% is a pound or a pint. Needs ½ pint (a cup) in the first 4 hours...the rest over the next 8 hours. Many good milking ewes will produce three times that amount. Freeze this spare colostrum in ice cube trays or in small plastic bags and thaw out as needed. Warm colostrum gently (usually in a water bath). Do not thaw or heat in a microwave. The antibodies in colostrum are proteins and can be destroyed if cooked.

Reviving Chilled Lambs

The revival of chilled lambs may be one of the most immediate problems facing the producer after the ewe has lambed. Knowing the severity to which a lamb is chilled helps the producer decide upon the proper course of action. Researchers at the West Virginia Agricultural and Forestry Experimental Station have devised a set of guidelines whereby the body temperature of the lamb indicates to what degree chilling has occurred.

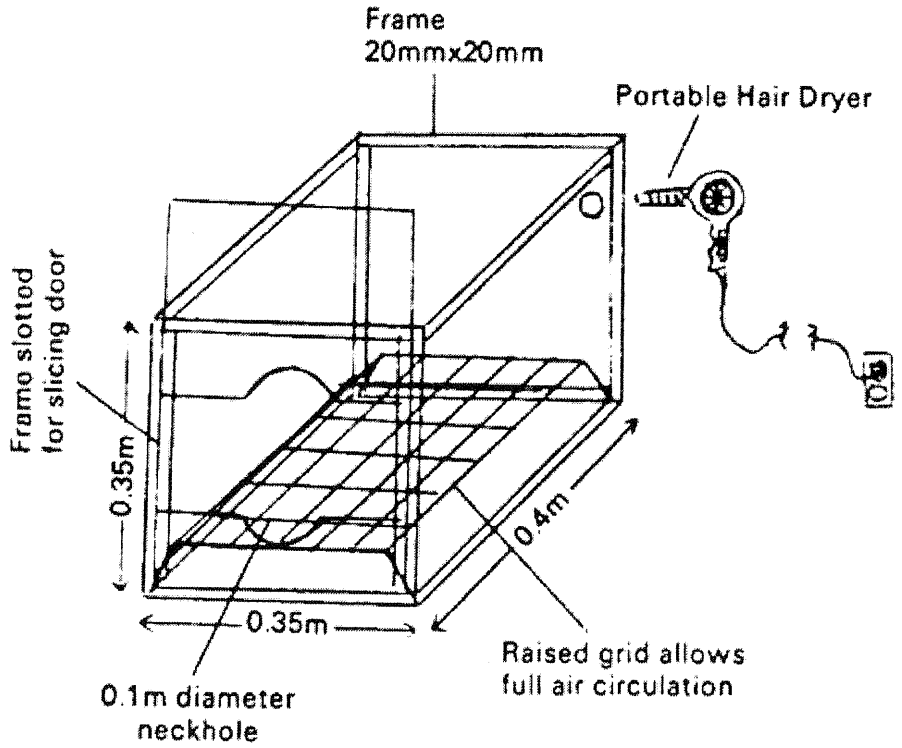
The normal rectal temperature of a lamb is 101°F. Lambs chilled below 101°F and above 97°F can be revived through nursing or force feeding, exposure to an external heat source such as a heat lamp and vigorous rubbing. Bedding, sacks or towels can be used to dry and warm the lamb. Lambs should be rubbed vigorously along the backbone and not over the rib cage as excessive pressure on the chest area can result in broken ribs. Limbs may also be exercised to stimulate muscular activity. If the temperature doesn't return to normal within an hour, methods used for reviving severely chilled lambs should be tried.

When a lamb's rectal temperature drops below 97 °F it has undergone severe chilling. These lambs are often unable to move and the immediate application of a high heat source is required to revive them. This may take in excess of 3 hours but should be continued until the lamb is sufficiently revived.

Immersion in warm water is an effective means of accomplishing this. The water temperature should be increased gradually (to no greater than 115°F) to prevent the lamb from going into shock which can result in death. Placing the lamb in a plastic bag for the water bath will help the lamb retain its natural odor and reduce the chances of rejection when returned to its ewe.

Another method of reviving severely chilled lambs involves the use of a "hot box" which may be constructed of either cardboard or plywood (Figure 1). An opening is cut in the box to allow a hairdryer nozzle to pass through. Another opening should be provided to allow the lamb's head to remain outside the box. The lamb should be placed on a raised rack allowing all body surfaces to come in contact with the circulating air.

Figure 1. Lamb Hot Box for Chilled Lambs. Courtesy: The Shepherd Magazine, Sheffield, Mass.



At this point we should be aware of one of the primary deficiencies in newborn lambs -- the lambs thermoregulatory system (internal thermostat) is only partially functional. It does not become completely functional until the lamb is about 3 days old. The lambs body temperature will fluctuate with changes in environmental temperatures.

During the first days of life the lamb will need to nurse at least 6 times a day. If the lamb becomes too chilled to nurse, it will soon die of starvation. The stress of chilling also reduces the lambs resistance to diseases such as scours and pneumonia. Providing shelter

for ewes with newborn lambs is intended to minimize losses in lambs due to environmental exposure. The period in the lambing pen is important in forming a strong bond between the ewe and her lambs that will be important in preventing losses due to abandonment in later life.

Lambs and ewes must be watched for signs of problems such as starvation, scours, and pneumonia. Early diagnosis is essential to effective treatment. To facilitate early diagnosis, ewes and lambs in the lambing jugs should be observed several times each day. Get all ewes and lambs up. Healthy lambs will usually stretch and try to nurse when gotten up. Observe lambs for general appearance and attitude, i.e. droopy ears, hunched up, sunk in sides, etc. If the lamb doesn't look "right" try to determine the source of the problem, i.e. hypothermia, starvation, scours, dehydration, pneumonia, physical injury, ewe with mastitis, ewe not letting lamb nurse, etc.

If all is going well the ewe and her new family should be ready to move to the nursery pens by 12 to 24 hours. If there are no nursery pens available, it is recommended to keep the ewes in the jugs another day or two. Upon leaving the jug the lambs and ewe should be identified with ear tags, paint brands, etc. so that if problems arise after they are turned loose they can be brought back together.

Summary of Procedures:

LAMBING TIME

(About 140 Days After Rams Are Turned Out)

- Be There/Keep Records
- Brand Ewes and Lambs With Lambing Number
- Clip, Dip & Strip
- Clip umbilical cord about 1 to 2 inches from lamb's body and dip the remaining stump in strong (7%) tincture of iodine. Check ewe to make sure both teats are fully open and functioning.
- ¼ ml of BoSe
- BoSe under the skin
- Make Sure Lamb Nurses
- Lamb should receive colostrum within 1 to 2 hours after birth.
- Warm Up Chilled Lambs

AFTER LAMBING - IN JUGS (Birth to 3 days of age)

- Number of Jugs
- Need one jug for every 10 ewes.
- Length of Stay
  - Remove lambs from jugs as soon as all are doing well. The normal recommendation is to move ewes and lambs to mixing pens on the 3rd day after lambing.
  - Many producers, however, feel that it is more desirable to move ewes and lambs to small mixing pens (3 or 4 ewes and their lambs) as soon as possible (24 hours).
- Check Every Lamb frequently Each Day
- Watch for signs of pneumonia, scours and starvation.
- Provide Place for Bottle Lambs

Lambing Time Equipment

- propylene glycol for treatment of pregnancy disease
- bearing retainers for treating prolapses, lamb puller
- thermometer, surgical scissors or pocket knife, suturing material
- lubricant plus disinfectant for assisting ewe during lambing
- mild soap, bucket and warm water
- antibiotic, uterine boluses
- injectable vitamin E and selenium mixture
- old towels to wipe off and dry newborn lambs
- heat lamps
- frozen colostrum from ewe or cow
- bottles, nipples, and stomach tube for helping weak or orphan lambs
- ear tags and paint brands for identification, lambing record book
- docking and castrating equipment
- mastitis treatment, scour remedies

Grafting Lambs

It is a good management practice, if possible, to graft lambs not receiving enough milk from their own mothers onto other ewes. A number of grafting methods are possible.

1. Slime Graft - Use fetal fluids from the ewe that the lamb is to be grafted to and rub the fluids and membranes on the lamb just before grafting.
2. Wet Graft - Immerse lamb to be grafted as well as the ewe's own lamb in a saturated salt solution.
3. Stanchion - Place the ewe's head and neck in a set of stocks where she can eat and drink but must allow lambs to nurse. Grafts of this type require from three to five days.
4. Lamb Coat - Skin the pelt off the lamb that died and tie the skin on the lamb to be grafted.
5. Stocking Graft - Place a stocking (burlap cover) over a ewe's own lamb for two to three days and then remove it and turn it inside out and place it on the lamb to be grafted.

When attempts to graft lambs fail, it is necessary to put the newborn lambs on milk replacer or even put them on goats if available.

Taken from The Sheepmen's Production Handbook (SID, Inc.), Revised 1986

Tips For Rearing Lambs Artificially

Within two to four hours after birth, decide which lambs among those from multiple births you should remove. Look for the weaker or smaller ones to choose for artificial rearing. It is important to make this decision early. Relatively weak lambs remaining with the ewes can experience more stress than those reared artificially. Consider the following tips:

1. It is essential that newborn lambs receive colostrum milk. Cow's colostrum will work if ewe's milk is not available. Do not dilute with water or warm too quickly if colostrum is frozen.
2. Lambs should be removed from sight and hearing distance of ewe.
3. Provide a warm, dry, draft-free area to start lambs.
4. Lambs will require some assistance the first day or two to teach them to nurse on whatever feeding device is used.

5. Avoid placing young lambs with older lambs, as they may be pushed aside and not be able to obtain milk replacer. Remember that lambs nursing ewes drink 25 to 40 times per 24 hours.

6. Hang a light over the milk replacer-feeding device and dry ration feeder.

7. Inject lambs in the first few days with Iron Dextran, Vitamin A-D-E, and Selenium-Vitamin E. At 15 days of age, vaccinate for overeating (Clostridium perfringens type C & D).

8. Start lambs on high-quality lamb creep feed at two weeks of age. Provide ample fresh water in front of lambs at all times. Do not feed hay or oats the first three weeks of age as it encourages bloat. Caution! Do not feed leafy alfalfa until two weeks after weaning, as it may encourage bloat.

9.Wean at 30 days of age or at a weight of about 25 pounds and when the lambs are eating creep feed.

Tube Feeding

Sometimes lambs are born too weak to nurse. Without that first colostrum, their survival rate is very low. If left to fend for themselves, they don't make it. However, many can be saved by tube feeding, even those too weak to suck.

The key is getting milk into them as soon as possible after birth. The milk should be warm but not hot. Generally 2-4 ounces every two hours will do the trick. Return the lamb to its mother as soon as it is strong enough to stand and nurse. Leaving it away from mother too long may result in the ewe rejecting the lamb.

The tubing should be 14 to 18 inches long and preferably rubber like that used for surgical purposes. What it can be attached to the spout of an antibiotic syringe (like those used to treat mastitis in dairy cattle); a needle-type syringe (preferably a 60 cc or about 2 ounce); or an all rubber ear syringe.

The tubing should be moistened or lubricated with a water-based lubricant before inserting it into the lamb's throat. It is very important to get the tube in the stomach and not the lungs. Mistakenly pouring milk into the lungs can cause pneumonia. If possible, it is best to insert the tubing into the lamb without it being attached to the syringe.

There are three ways to check if the tube is going into the right place. First, if a bump is encountered when inserting the tube, backup and try again. The length of tube inserted into the lamb should indicate whether the stomach is reached or not. Secondly, if air is felt coming out of the empty tube after it has been inserted, the lungs have been reached. Remove the tube and try again. Thirdly, the tube can be felt with a gentle pinch behind the windpipe.

The positioning of the lamb before inserting the tube depends on the amount of assistance available. In any situation, the head and neck of the lamb should be extended forward to allow a more direct path for the tube to get into the stomach.

If alone, place the lamb on a table or series of straw bales so that the lamb is at a handy height to work with. Have all four feet facing you and hold the body with your left forearm. Straighten the lamb's head and neck with your left hand while at the same time using your fingers to open the lamb's mouth to receive the tube.

If you have help, have the person hold the lamb by the elbows and let the lamb's rear hang. Use one hand to open the mouth and hold the head steady and the other to pass the tube.

TROUBLE SHOOTING CHART FOR "STARVING" LAMBS

IS EWE SICK —yes->	1) IS EWE OFF-FEED, DEPRESSED, LISTLESS, ETC.?	—yes->	CONSIDER PREGNANCY DISEASE (KETOSIS)
	2) IS EWE DOWN WITH TREMORS OR GRINDING TEETH?	—yes->	CONSIDER MILK FEVER
NO			
IS EWE REJECTING LAMB? —yes->	1) HAS EWE LICKED LAMB?	—yes->	FAILURE CONFIRMS PROBLEM
	2) IS EWE THE ACTUAL MOTHER?	—yes->	TRY TYING EWE
	3) IS EWE SHOWING PREFERENCE FOR A MATE OF THIS LAMB?	—yes->	TRY USING STANCHION FOR FEW DAYS
NO			
DOES EWE HAVE MILK AND A NORMAL, HEALTHY UDDER? —yes->	1) ARE TEATS CLEAR OF WAX?	—yes->	MAKE SURE MILK IS FLOWING
	2) IS A MATE TAKING ALL THE MILK?	—yes->	SUPPLEMENT LAMB OR REMOVE MATE FOR AN HOUR OR TWO EACH DAY
NO			
IS UDDER HARD OR LUMPY? —yes->	1) DOES EWE HAVE MASTITIS?	—yes->	TREAT WITH ANTIBIOTIC
	2) ON ONE SIDE ONLY?	—yes->	LEAVE ONE LAMB TO NURSE, FOSTER OR BOTTLE TWIN
	3) ON BOTH SIDES?	—yes->	FOSTER OR BOTTLE LAMB(S)
	4) IS THE UDDER ENGORGED	—yes->	IF ENTIRE UDDER IS A SOLID MASS, ALLOW LAMB(S) TO SUCK FOR LET-DOWN STIMULUS ALSO SUPPLEMENT LAMBS
NO			
IS EWE IN GOOD —yes-> CONDITION?	1) IS UDDER HEALTHY BUT EMPTY?	—yes->	SUPPLEMENT LAMB(S) BUT ALLOW SUCKING TO STIMULATE MILK PRODUTION
NO			
EWE IS IN POOR —yes-> CONDITION?	1) IS EWE'S CONDITION EXCEPTIONALLY POOR?	—yes->	FOSTER OR BOTTLE LAMB(S), MAY LEAVE ONE LAMB ON EWE AND INCREASE HER NUTRITION

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