

Friday, January 10

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 "Pasture Maintenance and Revitalization"
Dr. Ray Smith, Dept of Crop and Soil Environmental Sciences, Virginia Tech

2:00 "Lambing -Time Management & Saving Baby Lambs"
Dr. G.F. Kennedy, DVM, Pipestone Veterinary Clinic, Pipestone, MN

3:00 Break

3:15 Marketing Forum
"Religion and Lamb Consumption"
Mr. Waleed Faris, Virginia Tech Muslim Student Association Coordinator
"Experiences of the Scott County Katahdin Co-Op"
Dr. David Redwine, DVM, Gate City, VA
"Northeast Sheep and Goat Marketing Project"
Ms. Susan Schoenian, MD Cooperative Extension Sheep & Goat Area Agent
Panel and Open Discussion
Moderator: Dr. Scott Greiner, Dept of Animal & Poultry Sciences, Virginia Tech

4:30 "Understanding USDA Payment Programs for Sheep Producers"
Mr. Tom Covey, Virginia Cooperative Extension Farm Business Mgmt Agent

6:00 Social Hour and Commercial Exhibits

7:00 Lamb Banquet and Entertainment

Saturday, January 11

AM

7:00 Virginia Sheep Producers Association Annual Meeting (Breakfast)

"Lamb Promotion, Research, and Information Program Update"
Mr. David Greene, ASI Region II Representative, White Hall, MD

9:00 "Managing and Living with Predators"
Mr. Chad Fox, USDA Wildlife Services

"Dealing with Predators via Guard Animals" ---- Producer Panel

10:00 "Management Advice for Shepherds"
Dr. G.F. Kennedy, DVM, Pipestone Veterinary Clinic, Pipestone, MN

11:00 "Flock Biosecurity"
Dr. Kevin Pelzer, DVM, VA-MD Regional College of Veterinary Medicine

12:00 Lunch on Your Own

PM

1:00 ROCKINGHAM COUNTY FAIRGROUNDS

"Successful Ewe Lamb Development, Breeding, and Lambing"
Dr. Scott Greiner, Dept of Animal & Poultry Sciences, Virginia Tech
Dr. Kevin Pelzer, DVM, VA-MD Regional College of Veterinary Medicine

2:00 3rd ANNUAL VIRGINIA BRED COMMERCIAL EWE LAMB SALE
Rockingham County Fairgrounds

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2003 VA-NC Shepherds' Symposium
Presented By
Virginia Sheep Producers Association

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Pasture Maintenance and Revitalization Following Drought

S. Ray Smith and Chris D. Teutsch
Forage Extension Specialists
Virginia Tech

The last few years have been a tough for pastures in many areas of Virginia. Dry weather and high temperatures have limited forage growth causing many pastures to be grazed closer than they should have been. Moisture is a primary factor limiting forage growth in Virginia. In most cases it is not total annual precipitation, but rather the seasonal distribution of rainfall. Even though we have had adequate precipitation lately, the effects of last years drought will still be with this spring and summer and we must be prepared for drought periods that will come in the future.

Managing Drought Stressed Pastures

In most cases drought alone rarely kills well-managed pasture grasses. However, drought coupled with others stresses can weaken, thin, and even kill pasture stands. These stresses include poor fertility, overgrazing (prior and during drought), and elevated pest pressure. Although droughts cannot be predicted or prevented, they can be prepared for. The best management strategy is to continuously prepare for drought. This is accomplished by using good pasture management. The following suggestions will help to maintain healthy pastures that will grow longer into a drought and recover faster after rain comes.

Maintain correct soil pH

Soil pH for grass-clover pastures should be maintained between 6.2 and 6.5. Lime pastures more frequently rather than waiting and applying large quantities of lime at once. Use dolomitic lime when magnesium levels are low.

Maintain phosphorus and potassium

Phosphorus and potassium levels should be maintained in the high range. Phosphorus is an important element in the compound ATP which is the energy currency in the plant. It is also plays a major role in root growth and survival of newly established seedlings. Potassium is required in relatively large quantities and substantial amounts are removed from hay fields. Potassium is involved in stand persistence especially for legumes. Proper levels of this element increase winter hardiness and disease resistance.

Rotationally graze pastures

Energy is required for pasture regrowth after grazing. The source of this energy is photosynthesis taking place in residual leaf area and carbohydrates stored in the plant. Rotational grazing allows producers (rather than the animal) to regulate the amount of leaf area retained after grazing and the amount of time pastures are rested between grazing events. Most pastures should not be grazed closer than 2-4 inches, but 4-6 inches would be better. Rest periods are important since they allow the plant time to recharge the carbohydrates that were utilized for regrowth after grazing. Rest period length will vary with season and weather conditions. In general shorter rest periods are required in the spring and fall when plants are actively growing while longer periods are required in the summer months when plant growth

is slowed by high temperatures and moisture stress. Rotationally grazed pastures recover from drought faster than continuously grazed pastures.

Maintain stubble

Maintaining 4-6" of stubble helps to shade the soil surface and prevent water evaporation. Stubble also shades grass crowns aiding in the survival of species such as orchardgrass and endophyte free tall fescue.

Maintain healthy root systems

Roots not only anchor plants to the soil, but also provide a means to absorb water and nutrients required for growth. Roots are out of sight and often out of the mind of many producers, but their importance to the overall health of the pasture should not be underestimated. Close and frequent grazing reduces the size and depth of the root system making the plant less tolerant to drought. Rotational grazing helps to maintain a healthy root system that can sustain plant growth longer going into a drought and speed growth after rain finally comes.

Feed hay when pastures are not growing

Pastures can easily be damaged by overgrazing during drought periods. A better alternative is to restrict animals to a single paddock and feed hay. This will isolate the damage to one paddock and will allow for rapid recovery of the other paddocks when rain finally comes. Resist the temptation to open all the gates and let the animals roam wherever they want.

Stockpiling for Winter Grazing in Drought Years

Stockpiling tall fescue is one the cheapest and best ways to provide winter grazing for livestock in Virginia. In good years, tall fescue pastures top-dressed with 60-80 lb nitrogen/A in mid August can produce 1-2 tons/acre hay equivalent. The question most often asked in drought years is: Does this recommendation work for dried up, overgrazed pastures? No pasture will respond to nitrogen until it rains. In addition, pastures that have been overgrazed have the least potential for fall growth. Applications of nitrogen for stockpiling should target pastures that have not been overgrazed or have been overgrazed the least. The next question is when and how much nitrogen to apply. In a drought year there are several approaches to stockpiling. The first is to apply nitrogen in mid August at normal rates and then pray for rain. The second is to delay applications until rain looks like a sure thing. This option requires more planning since nitrogen needs to be applied prior to the impending rain. As the application date becomes later decrease the amount of nitrogen since the grass will have less time to grow before frost and cool temperatures set in.

It is easy to say don't graze drought stressed pastures, but in many cases there may no way to avoid it. Most healthy pastures should be able to withstand some severe grazing (removing most of the leaf area, but not repeatedly) during a drought. However, pastures that are overgrazed (closely grazed and never allowed to rest) will be much more susceptible to injury from grazing during drought. In addition, not all plant species respond to drought and grazing in a similar manner. Below is a brief description of common forage species and their response to drought and grazing.

Alfalfa. Alfalfa possesses a deep taproot making it one of our most drought tolerant legumes. During periods of severe drought and high temperatures alfalfa will go dormant, but is generally not damaged. During these periods alfalfa will bloom at a short height, and can be grazed off without injuring the stand.

Red Clover. Red clover also possesses a taproot, but it is much shallower than alfalfa. Drought stress can injure established stands of red clover, shorting stand life. Hot and dry conditions are especially damaging to newly established seedlings.

Ladino and White Clover. Ladino and White clover are relatively shallow rooted legumes. Production during drought is low, but plants usually persist and regrow from either stolons or hard seed.

Orchardgrass. Orchardgrass is a strong perennial grass with fair drought tolerance. This grass will persist during hot and dry conditions if it is not overgrazed. It will not tolerate close and frequent grazing and therefore works best in rotationally grazed systems. Orchardgrass is not as well adapted to southern and eastern Virginia and does not persist well under poor management.

Tall Fescue. In Virginia, endophyte infected tall fescue is the best adapted cool-season grass and will in most cases survive even severe drought. It is more tolerant of mismanagement than orchardgrass, but also responds well to rotational grazing. The endophyte imparts grazing and drought tolerance to tall fescue, thus endophyte free varieties are not as tolerant to drought stress, but can survive with optimal management.

Kentucky Bluegrass. Bluegrass is a sod forming perennial cool-season grass that tolerates close and frequent grazing and is best adapted to the higher elevations and areas west of the Blue Ridge Mountains. This grass possesses a relatively shallow root system and is not drought tolerant. Bluegrass routinely goes dormant during the summer months when temperatures are high and moisture is limiting. However, bluegrass normally resumes growth in the fall when soil moisture is abundant and temperatures are lower.

Bermudagrass. Bermudagrass is a sod forming perennial warm-season grass that is best adapted to the Southern Piedmont and Coastal Plains Regions of Virginia. This grass tolerates close and frequent grazing and possesses excellent drought tolerance. Even bermudagrass though requires some water to remain productive. An advantage of bermudagrass is that it produces about twice as much dry matter per unit of water in comparison to most cool season grasses. It also responds well to smaller amounts of water supplied by summer thunderstorms compared with cool-season grasses.

Revitalizing Drought Stressed Pastures

Virginia's drought stressed pastures often look worse than they really are. This is especially true for pastures that were well managed prior to drought. In many cases pastures can be revived without reseeding. The key element of course is rain. The response of pastures to every input or management practice is dependent on moisture. In many cases,

pastures simply need to be rested and fertilized: 1) adjust the soil pH; 2) bring phosphorus and potassium to the high level; 3) and apply a small amount of nitrogen (40-50 lb/A) in November or early December (prior to a hard freeze). A late fall late nitrogen application will not produce a great deal of fall growth, but it will stimulate tiller production and root growth. Spring growth from these stands will be vigorous and thin areas will thicken faster.

Pasture legumes such as red and white clover are important components of pastures and in many cases could use thickening up even before drought. Pasture sod that has been suppressed by drought and overgrazing provide a perfect opportunity for interseeding clovers and alfalfa. Legumes can be either drilled in the fall or spring or frost seeded in late winter. Frost seeding works best with red and white clover. Alfalfa is better established using a no-till drill.

Sod Suppression

The existing sod must be suppressed and plant residue reduced prior to seeding. Sod can be suppressed by hard grazing in late fall and early winter. Overgrazing reduces the competitiveness of the sod and eliminates plant residue. This allows for seed to reach the soil surface and establish good soil-seed contact. Good soil-seed contact is essential for germination and emergence. Vegetation can also be suppressed using herbicides. A low rate of glyphosate can be applied prior to seeding, but paraquat is usually preferred since it results in a brittle residue that is easier to seed into. For fall seedings graze sod to a height of 2-4 inches and apply 0.8-1.5 pt/A of paraquat + surfactant approximately 2 weeks prior to seeding. For spring seedings apply 0.8-1.5 pt/A of paraquat + surfactant to a closely grazed sod in November. An additional treatment may be necessary in the spring to control winter annual weeds.

Seeding Methods

There are a number of seeding methods that can be used to introduce legumes and grasses into established sods. These include livestock seeding, frost seeding, minimum tillage, and no-tillage. Regardless of the seeding method, the goal is to achieve good soil-seed contact. Good soil-seed contact ensures that the seed will germinate and emerge in a timely manner. While all of these methods are biologically viable, minimum tillage and no-tillage produce the most consistent results. This is primarily due to the fact that both of these methods are putting the seed in contact with soil, and do not depend on nature to incorporate the seed.

Livestock Seeding

Livestock seeding is when seed is fed to the animals, passes through the rumen and lower gastrointestinal tract, and is deposited on the pasture in the manure of the animal. This method works best for legumes because they have a hard seed coat and pass through the animal intact. Grass seed are usually digested in the rumen, and therefore few remain viable. Although this method has been successful on large rangeland areas out west, it has several problems. The first problem is that manure is not uniformly distributed over the pasture area resulting in highly variable stands of legumes. A second problem is that germination and emergence from dung pats does not necessarily mean that interseeding was successful. In many cases seed will germinate and emerge from the dung pat, but the roots of the seedling

will never penetrate the soil. As the dung pats dry out many seedlings will die from desiccation. A third problem is that there is no way to successfully inoculate the legume seed with N fixing rhizobia since inoculum applied to the outside of the seed does not survive in the digestive tract of the animal.

Frost Seeding

Frost seeding is accomplished by broadcasting seed onto the soil surface in late winter/early spring. The freezing of the soil surface during the night and thawing during the day cause cracks to form. The formation of these cracks incorporates the seed into the soil. In order for frost seeding to be successful the seed must reach the soil surface. Therefore, reduction of plant residue on the soil surface is critical. In addition, the seed must be broadcast early enough that adequate freeze-thaw cycles take place to incorporate the seed (usually 4 to 6 weeks of frost action). In Virginia, frost seedings are most successful when seed is broadcast in late January to late February (depending on your location). This method is most successful with red and ladino or white clovers and annual lespedeza. It does not work as well with grasses and alfalfa. Seeding rates are shown in Table 1.

Table 1. Legume seeding rates for frost/broadcasting seeding.

Plant Species	Seeding Rate -----lb/A-----
Red Clover alone	8-10
Ladino or White Clover alone	1-3
Red Clover + Ladino or White Clover	4-6 and 1-2
Annual Lespedeza alone	15-20
Annual Lespedeza + Ladino or White Clover	8-10 and 1-2

Minimum Tillage Seeding

Minimum tillage seeding is accomplished by disturbing 40-60% of the established sod. This can be done using a disk, field cultivator, or other tillage implement. The tillage does not need to penetrate the soil more than 2-4 inches. The use of tillage helps to suppress the sod and expose bare soil. After tillage, the seed is broadcast onto the soil surface and cultipacked. In some cases a conventional grain drill can be used to distribute the seed. When establishing alfalfa, the majority of the sod should be disturbed. This seeding method can be used to reintroduce both perennial grasses and legumes or to overseed annual grasses and legumes into an established sod. Depending on the species being established this seeding method can be successful in either late summer or early spring. Seeding rates are shown in Table 2.

No-Tillage Seeding

No-tillage seeding is accomplished by using a no-till drill. A no-till drill possesses a coulter, which cuts slit in the sod. This coulter is followed by a double disk opener, which opens the slit and drops the seed in. The open furrow is closed and seed is pushed into contact with the soil by a press wheel. No-till seeding requires more effort and attention to detail, but produces more consistent results than the other seeding methods.

Table 2. Seeding rates for minimum- and no-tillage seeding.

Plant Species	Seeding Rate
	-----lb/A-----
Red Clover alone	8-10
Ladino or White Clover alone	1-3
Alfalfa alone	12-20
Red Clover + Ladino or White Clover	4-6 and 1-2
Annual Lespedeza alone	15-20
Annual Lespedeza + Ladino or White Clover	8-10 and 1-2
Red Clover + Ladino or White Clover + Orchardgrass	4-6 and 1-2 and 8-10
Red Clover + Ladino or White Clover + Tall Fescue	4-6 and 1-2 and 8-10
Annual Ryegrass	25-35
Annual Ryegrass + Crimson Clover	15-20 and 10
Small Grain	90-120
Small Grain + Crimson Clover	90 + 10
Small Grain + Annual Ryegrass	90 + 15
Small Grain + Annual Ryegrass + Crimson Clover	90 + 15 + 10

No-tillage seeding can be used to reintroduce perennial grasses and legumes or to overseed annual grasses and legumes into an established sod. This seeding method can be successfully implemented in either late summer or early spring. If clover is present in the sod, late summer seedings of alfalfa can become infected with sclerotinia crown and stem rot. Since this disease affects smaller seedlings, seeding in mid-August can help to reduce the severity of the infection. Another option is to seed alfalfa only in the early spring.

Since no-tillage seeding does not disturb the sod, it is especially important to suppress the sod before seeding. In many cases a herbicide application may be required, especially for alfalfa. Placing the seed too deep in the soil when no-till seeding is a common mistake that results in stand failures. In general, forage grasses and legumes should never be seeded deeper than one-half inch. It is critical that seeding depth is checked every time the drill is used since seeding depth varies with soil conditions. A general rule is that if a little seed cannot be seen beside the slit, then the seeding depth is too deep.

Controlling Competition

Regardless of the seeding method, it is absolutely essential that competition from the existing sod and weeds be controlled after the seed has germinated and the seedlings have emerged. Failure to control competition during establishment allows weeds and established vegetation to successfully compete for water and nutrients and shade new seedlings. *This will lead to stand failure.* Competition can be successfully controlled by flash grazing or clipping at a height just above the growing seedlings. Flash grazing is accomplished by restricting a large number of animals to a relatively small area for a short period of time. This results in the quick removal of competing vegetation in a uniform a manner. It is important that clipping or grazing be done in a timely manner so that the competing vegetation does not get ahead of the seedlings. Grazing or clipping may damage or kill some seedlings, but the losses will be far less than if the competition is not controlled.

Key Points to Remember

- *Control Broadleaf Weeds.* Broadleaf weeds must be controlled prior to seeding legumes. This is best accomplished by controlling weeds the season prior to renovation.
- *Soil Test and Adjust Fertility.* In order for pasture renovation to be successful proper soil fertility is required. Lime and fertilize pastures according to soil test results. Lime should be applied six months prior to renovation.
- *Suppress Sod and Decrease Residue.* The existing sod must be suppressed and plant residue reduced prior to seeding. The reduction in plat residue facilitates good soil-seed contact. This can be accomplished by hard grazing in late fall and early winter or by using herbicides.
- *Ensure Good Soil-Seed Contact.* Regardless of what seeding method is chosen, good soil-seed contact is required for seed germination and emergence.
- *Seed on Proper Date.* Successful renovation can be done in either late summer or early spring. Prior planning and preparation are important so that seeding can be done in a timely manner.
- *Use High-Quality Seed of an Adapted Species.* Choose forage species that are adapted to the area and end use. Use either certified or proprietary seed to ensure high germination, seed genetics, and low noxious weed content. Cheap, low quality seed often cost more in the end due to lower production and thin stands.
- *Inoculate Legume Seed.* Always inoculate legume seed with the proper strain of nitrogen fixing bacteria prior to seeding. This is relatively inexpensive insurance that legume roots will be nodulated and efficient nitrogen fixation will take place.
- *Control Seeding Depth.* Small seeded forages should never be placed deeper than ½ inch. Always check seeding depth since it will vary with seedbed condition and soil moisture status. Placing forage seed too deep is one the most common causes of stand failures.
- *Control Post-Seeding Competition.* Failure to control post-seeding competition is one of the most common causes of stand failures. Clip or graze the existing vegetation to a height just above the developing seedlings. This must be done in a timely manner to ensure that the competing vegetation does not get ahead of the seedlings.

Summary

Drought rarely kills well-managed pasture plants. In most cases, drought stressed pastures are in better condition than they appear. Most pastures can be revived with rain, rest, and fertilization. Weakened sods provide a prime opportunity for incorporating legumes in established pastureland. With a little tender loving care this year's drought stressed pastures will be next year's profit. Remember grass is one of Virginia's most valuable resources.

Religion and Lamb Consumption

Waleed F. Faris
Muslim Students Association Coordinator
Virginia Tech

Introduction

It is a pleasure for me to have the opportunity to talk about some aspects of my religion, Islam, and their impact on economy in the US in this symposium. The title of the lecture may seem “funny” for some and may seem “serious” for others. Anyhow, it is serious.

What I will try to do in the following is to give a very brief introduction about Islam in US and Islamic rituals and their relation to lamb consumption, then I will give some figures about the economic impact of Muslims consumption of lamb and goat on the US economy. Finally, I will give some recommendations for those who would like to approach the lamb market in Muslim communities whether in US or internationally.

Muslims: market size

The number of Muslims all over the world is estimated as about 1.5-1.8 billions according to different estimates [1-2] and constitute at least 26% of the world population. This population is distributed with different proportions all over the world. The highest densities of Muslim population are in Africa and Asia. Also, Muslims are from all the ethnic groups on earth e.g. Arabs, Chinese, Japanese, Jews, white Americans and Europeans, Africans, Indo-Paks, etc. Islam annual growth rate (1994-1995) from UN [2] is 6.4%, which indicates a very rapid growth rate. The estimates of Muslims in US range between 5-10 millions [1-2] according to different criteria of estimation and their percentage is about 2%-3.8% according to the previous estimates. The above figures are important to indicate the market size for lamb consumption whether in US or internationally. Unfortunately, we do not have estimates for the lamb consumption on Muslims in US but we can have some assessment by relating Muslim population percentage in US to that of UK because we have reliable estimates for the consumption in UK. Although Muslims make up just five percent of the population in UK, they consume an estimated 20% of all lamb and mutton produced in UK [3]. If we make a simple relation between the above estimate and the worldwide level, we may say that Muslims consumes around 85% of the world lamb and mutton production and that around 16% of the US consumption of lambs is by Muslims.

Why and when Muslims consume lambs?

Islam requires from its followers some few obligations, which are called “pillars of Islam” these are:

- 1- Testimony that there is no God but Allah and Mohammed is his Messenger.
- 2- Five prayers a day.
- 3- Fasting one month a year i.e. “Ramadan”.
- 4- Paying a yearly tithe from your earning which depends on the type of earnings.
- 5- Pilgrimage (Hajj) to Mecca once in your life upon capability.

In the fifth pillar, it is required by all who attend Hajj to sacrifice a lamb or mutton during these days (estimates for the number of performers of Hajj annually are about 2 millions). Also, it is strongly recommended that all other Muslims who could not go to Hajj to sacrifice also in the same time period every year, (which represent a huge percentage of consumption annually). This recommended practice is done in one of the Muslims religious feasts called "Eidul-Adha" or the feast of sacrifice, which glorifies the sacrifice of Prophet Abraham (Ibrahim) of his elder son Ishmael (Ismael). The sacrificed animal is called "Udhya". Another religious practice in which Muslims sacrifice a lamb, goat or mutton is the birth of a new baby, male or female. It is strongly recommended in such an occasion to sacrifice at least one lamb, goat or mutton. These are the primary practices in which Muslims consume lambs, goats, or muttons.

What are the requirements for animal slaughtering to be accepted islamically?

The accepted animal slaughtering in Islam is called sometimes "Zabyha" or generally "Halal" meat.

Here are strict requirements for the slaughtering of animals, The Prophet Mohammed (peace be on him) said **"Allah has ordained kindness (or excellent) in everything. If slaughtering is to be done, do it in the manner, and when you slaughter, do it in the best manner by first sharpening the knife and putting the animals at ease"**.

Islamic Rules of the Slaughtering [4]

The laws are translated into practice, as follows: "According to the Islamic (Shariah) law" the legal purification of the flesh of animals requires that the following conditions be met.

1) Slaughterman must be mature and pious Muslim of sound mind who understands fully the fundamentals and conditions relating to Halal slaughter and be approved by the religious authorities. According to another considerable opinion in Islamic Shariah the slaughterman maybe from the People of the Book (Christian or Jew) and not necessarily a Muslim.

2) The Halal animals and birds species for which approval is sought, these animals and birds will be slaughtered by an authorized Muslim slaughterman in accordance with the Islamic Law. The means by which the animals and birds will be rendered unconscious (whilst ensuring that they are NOT KILLED prior to the slaughter ritual), should be slaughtered by a sharp knife, which is capable of making the animal bleed by severing blood vessels, respiratory tract and esophagus.

3) NO name other than Allah's should be mentioned over the animal at the time of slaughter.

4) The name of Allah should be mention while slaughtering. This is clear from Qur'anic texts and ahadith, Allah Ta'ala say: **Then eat of that over which the name of Allah has been mentioned, if you believe in His signs. (6:118) And do not eat of that over which the name of Allah has not been mentioned for truly that is impiety (6:121)**

The name of Allah at slaughtering is "Bismillah, Allahu Akbar"

5) Specifications must also include the checks required by the slaughterman supervisor or Halal inspector. These will include the type and frequency of inspection of the stunning apparatus to be carried out by the works electrician, or mechanical aspects. The frequency of checking on the operating skill of stunner, Muslim slaughtermen and how often an animal will be removed from the process before sticking to ensure it has been properly stunned.

6) Specifications must also include the cleanliness, Halal slaughter laws are based on cleanliness, sanitation, and purity. All utensils must be clean and free of contamination from any unlawful or harmful substances.

7) Any by-product or derived ingredients must also be from duly animals to be for Muslim consumption.

The above conditions are the strict guidelines. There are some disputes in some of them that may relax some of these conditions like what I have pointed out in the first condition. Anyhow, the best way to check this is to cooperate with the local religious authorities for local distribution or with the international religious organizations for international distribution and they will welcome such cooperation so much.

Sheep and Goats in US and Halal Slaughter

In one of their circulation, the US Department of Agriculture stated the following concerning the importance of Halal slaughter to Sheep and Goats industry in US: [5]

“Contrary to the overall declining trend in the United States’ lamb, mutton, and goat consumption, there is a growing, high-value market to be found among the American Muslim population.

Entrance into this particular market, as well as Muslim markets overseas, requires Halal certification. Halal is an Islamic religious term used to describe food that is “lawful” to eat. It is similar to Kosher in the Jewish religion in many ways. Many slaughterhouses in the United States already meet the standards set by the American Muslim community for Halal status. The USDA has had a policy on Halal labeling in effect since 1996. Halal requirements are not difficult to meet, and the USDA believes that any American slaughterhouse should be able to comply with the new Halal policy. The general requirements for Halal slaughter state that the animal must be humanely treated en route to and at the slaughterhouse. The throat must be slit in a certain way, while the word “Allah” (God) is said. The blood must then be drained from the body. It is vital that the sheep carcass does not come in contact with pork, or anything that has ever touched pork, at the slaughterhouse.

The U.S. government is negotiating with several major Muslim countries to gain acceptance of U.S. Halal standards as equivalent to their own. This will open more markets to U.S. lamb and mutton exporters, as at least twenty Muslim countries require Halal certification for meat. There are 1.5 billion Muslims throughout the world, so the potential market for Halal meat is very large. Currently the United States is negotiating with Saudi Arabia (any agreement would extend to the rest of the Gulf Cooperation Council: Kuwait, Oman, Qatar, United Arab Emirates, and Bahrain), Egypt, and Malaysia.

There is a market in Saudi Arabia every year for live sheep that meet Halal standards for sacrifice: over the age of six months, in good health, and showing no defects. Between one and two million sheep are sacrificed at the end of the Hajj (pilgrimage to Mecca) every year. New Zealand and several Middle Eastern and African states currently dominate the live export market to Saudi Arabia.

A good example of the benefits of Halal certification is New Zealand's export lamb and mutton industry. New Zealand, which does not have the incentive of a domestic Muslim population like the United States, has had an official Halal program since 1983. "Today New Zealand is the largest exporter of Halal slaughtered lamb and mutton in the world. As their markets in Muslim countries increased, New Zealand expanded Halal production. In 1991 there were 29 approved Halal slaughtering plants, and by 1998 the number increased to 42. Approximately 78 percent of all sheep slaughter (and 50 percent of beef) in New Zealand is Halal certified today. They ship Halal meat to both Halal and non-Halal markets. New Zealand found Halal slaughter to be so easy and so profitable that it was cost effective for them to send animals to Halal slaughterhouses regardless of whether the meat would be exported to a Halal market or not."

I used this long quote to point out the importance that US Department of Agriculture foresees in the Muslim markets whether domestic or international and the New Zealand experience concerning that market.

What to be done to get into the Market?

The following are some recommendations concerning the entrance of the local and international markets:

- 1- Try to get contact with religious authorities in your area to have their advice on the size of the market and the best way to meet the Islamic regulations concerning lambs, goats and muttons.
- 2- Once you know the way publicize as much as you can.
- 3- Give facilities to the individuals and the whole sales as well.
- 4- Be flexible in accommodating the different needs to your customers.
- 5- It would be of advantage to hire Muslim slaughterman as part of your team.

References

- 1- Institute of Islamic Information and Education (IIIE) estimates based on CIA World FactBook
<http://www.iiie.net/Intl/PopStats.html>
- 2- <http://islamicweb.com/begin/results.htm>
- 3- The Muslims Council of Britain
<http://www.mcb.org.uk/links/leftmenu1.php>.
- 4- Australian Halal Food Services
<http://www.ahfservices.com.au/guidelines.html>.
- 5- United States Department of Agriculture
<http://www.fas.usda.gov/dlp2/circular/1998/98-10LP/sheep3.htm>.

Experiences of the Scott County Katahdin Co-op

David S. Redwine, DVM
Gate City, VA

History

Scott County, Virginia is a large mostly rural county located in extreme southwest VA only a few miles from the borders of TN, WV, and KY. It is in the heart of the Appalachian mountain range and as a result, most farmland varies from rolling hills to steep ridgeland with many limestone outcroppings. Much of the land is not suitable for grain farming, and as a result, most farming is centered around grazing livestock until they reach market weight.

Most farms average 60-70 acres, and serve as supplemental or secondary income. Burley tobacco historically has been the main crop, but recent problems with disease, weather, and government quota cuts has left growers looking for other ways to utilize their land. In the late 60's, sheep were popular here and most farms kept at least a few to graze with their cattle. As prices dropped gradually, producers found themselves battling parasites, foot rot, stray dogs, and sold off sheep and switched to cattle and burley. By around 1990, total numbers of sheep in the entire county was 50 head.

In 1997, my uncle and I brought the first Katahdin ewes (15) in from Lexington, Ky. We selected them due to their reputation for low maintenance, and resistance to parasites, foot rot, and other diseases. As word spread about these trouble free sheep, neighbors and other farmers began requesting ewe lambs and demand soon outgrew supply. Fencing and guard animals solved the predator problem and our flocks flourished.

The Co-op

-Getting Started-

Biggest Obstacle: Few members had any previous sheep experience.

Biggest Asset: Few members had any previous sheep experience.

Because this was a new venture, and many people needed education and advice on sheep production, twenty five producers came together in 2000, and formed the Scott County Katahdin Co-op.

We needed and organized plan to address the huge demand for lambs that we were getting. This was a diversified group with some expertise in production, health, and direct marketing. We held quarterly meetings on topics such as selection of breeding stock, lambing, marketing, and other issues as they came up.

****MOST IMPORTANTLY, WE ALL HELD THE COMMON FEELING THAT IF WE WERE GOING TO DO THIS , WE WERE GOING TO DO IT CORRECTLY.**

-Building a Superior Product-

***Goal*:** We didn't just want to raise Katahdins, we wanted to raise the best purebred Katahdins to be found east of the Mississippi.

1. We retained only high quality ewes, based on phenotype, milk, and production records.
2. All flocks used similar , high quality rams.
3. All flocks must adhere to our simple but complete health program.
4. All males castrated except top 5% of crop.
5. We ordered supplies and minerals as a group.
6. All flocks must lamb in either Jan. or April.
7. All flocks used same ear tag, which increased our ability to provide large groups of similar lambs from different flocks.

Marketing: Three Areas

1. High quality breeding ewes and rams.
 - universities
 - other breeders and producers
2. Market lambs
 - large groups
 - New Holland Sales Stable
 - direct to packers
3. Dressed Lamb
 - whole, halves, cuts, etc.
 - health food stores , religous and ethnic groups , word of mouth

****WE ARE SELLING CONFIDENCE!**

Website placed online (Hillcrest Katahdins) (see KHSI Breeders list) made a huge impact on demand. Referrals from universities and other customers produced many sales. We tell everyone we know about lamb.

Lessons from New Holland Sales Stable

1. Be a student of the market report (twice weekly)
2. Know the ethnic calendar
3. Develop a relationship with Ken Smoker
4. Let him know what and when you are delivering lambs.
5. Represent your offering honestly.
6. Feed and water your own lambs (5 to 10 pounds per lamb)

2002 Lamb Crop

- 95 head of breeding rams and ewes to 3 universities averaged \$139/hd.
- 225 ewe lambs sold to private individuals averaged \$118/hd
- 20 ram lambs privately averaged \$125
- 65 wethers (over 100 pounds) killed and direct marketed netted \$115
- 195 market lambs to New Holland averaged 79# and .91 cents

Benefits of a Co-op:

1. Group purchasing power.
2. Ability to assemble large orders of similar sheep. (raises asking price)
3. Pride and comraderie among members.
4. Increases marketing options and opportunities.
5. Numbers attract attention from media and others.
6. Massive exchange of knowledge and experience from trial and error
7. Help constantly available

Cons of a Co-op

1. 20% of people do 80% of work.
2. Personality conflicts
3. Telling a member, "they're not good enough"
4. Members must "play by the rules" or compromise.

Conclusion:

We currently have 32 flocks and 930 ewes enrolled . Morale is high and our members enjoy helping each other. In 2001, Katahdins were 5th nationally in numbers of lambs registered. That doesn't include more than four times that many that entered commercial production. We are very proud of what we have accomplished and look forward to the future with this great breed of sheep!

FOR QUESTIONS OR TO PLACE ORDERS FOR LAMBS , CONTACT:

David S. Redwine, DVM
Rt. 4, Box 514
Gate City, VA 24251
276-386-6101
cowdoc@mounet.com

Martha Mewbourne
Rt 2, Box 776A
Nickelsville, VA 24271
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ttfarm@mounet.com

SCOTT COUNTY HAIR SHEEP CO-OP

FLOCK HEALTH PLAN

Winter Lambing

- August 1 - examine ewes closely and cull bottom 10% (age, udders, etc.)
- trim feet and deworm all ewes and ram
 - begin flushing ewes with 1/2 lb. shelled corn per head
 - move to best pasture if available
- Sept 1 - put marking harness on ram and turn into ewes
- ewes should start lambing Jan. 24th
 - check twice daily and record numbers of ewes that are marked.
- Oct 15 - deworm entire flock
- reduce nutrition to pasture and/or hay only
- Nov 1 - Remove ram from flock
- Dec 25- Jan 1
- deworm ewes
 - give 2cc Covexin 8 under skin
 - begin 1/2 lb. shelled corn daily
 - move ewes to lambing pasture
 - prepare lambing barn and pens
 - assemble supplies in lambing kit
 - enjoy your last 3 weeks of rest for several months
- Jan 24 - Feb 28
- check ewes several times daily
 - identify lambs and move to jugs for 48 - 72 hours

- dip navels, check udders
- ear tag, castrate males
- increase corn fed to ewes to 1# per lamb per day

- Feb 15 - prepare creep feeder and begin creeping lambs

- April 1 - deworm lambs and ewes
- give lambs 5cc Covexin 8 under skin

- May 1 - give 2cc Covexin 8 to lambs
- decrease grain to ewes

- June 15 - deworm ewes and lambs
- wean lambs and move to best pasture
- feed 1 -2 lbs grain daily
- select top 10% of ewe lambs for replacements
- sell remainder to contract buyers
- watch market and promote sales of wethers
- invite friends and neighbors over for lamb Kabobs!!

Update on the Northeast Sheep and Goat Marketing Program

Dr. Michael Thonney and Susan Schoenian
Western MD Research & Education Center
Keedysville, MD

The Northeast Sheep & Goat Marketing Program at Cornell University was established in January 2001 to improve the marketing infrastructure for sheep and goats in the twelve northeastern states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and West Virginia. The program is funded by the Lamb Meat Adjustment Assistance Program, which resulted from legal actions taken by the American Sheep Industry Association to limit cheap lamb imports to the U.S.

Bob Melchoir was highly effective in the marketing coordinator position for the program until his unexpected death in early August. To continue to serve producers in the Northeast and fulfill the obligations of the grant, Cornell University elected to fill the marketing coordinator position. Susan Schoenian, a University of Maryland (small ruminant) Extension Agent and sheep and goat producer assumed 50% of the responsibilities of the position and concentrates her efforts in the southern half of the twelve state region. Chris Parsons, a goat producer and custom processor from Pine City, New York, performs 50% of the duties and focuses his efforts on the northern half of the region. Susan can be reached at (301) 432-2767 ext. 343 or ss80@umail.umd.edu. Chris can be reached at (607) 732-4987 or CGP@starband.net.

The Northeast Sheep & Goat Marketing Program has accomplished many of its stated objectives. Regional Marketing Summits were held in the northern, middle, and southern parts of the region at the beginning of the granting period to publicize the program and get feedback on methods to improve marketing infrastructure in our region. Program staff and an advisory board with representatives from each of the twelve states have implemented several pilot marketing projects. Graded tele-auctions have been organized at various locations in New York State. A successful marketing pool has been established whereby a group of a half dozen producers, representing 1,200 ewes on accelerated lambing programs, is supplying 10 to 20 "premium quality" lambs per week to a retail market in New York City. A marketing pool to sell animals direct to New York City live animal markets will undergo its trial run for the Thanksgiving holiday season. Development of a kosher/halal kill floor for small and medium sized plants has also been a goal. A safer slaughter knife for Halal slaughter successfully underwent testing at several sites and a "humane" restraining system for ritual slaughter (Kosher and Halal) was also successfully tested at a plant in southeastern Pennsylvania.

One of the primary accomplishments of the Northeast Sheep & Goat Marketing Program is the establishment of a sheep and goat marketing web site at www.sheepgoatmarketing.org. The site includes program information, news, links, calendar of events, links to regional auction prices, an ethnic calendar, articles on marketing, and a directory of producers, feeders, dealers, buyers, sellers, auction houses, retailers, wholesalers,

and processors. It is a one-stop resource for marketing information for sheep and goat producers in the Northeast. One of its latest additions is a slide show featuring the humane restraining system.

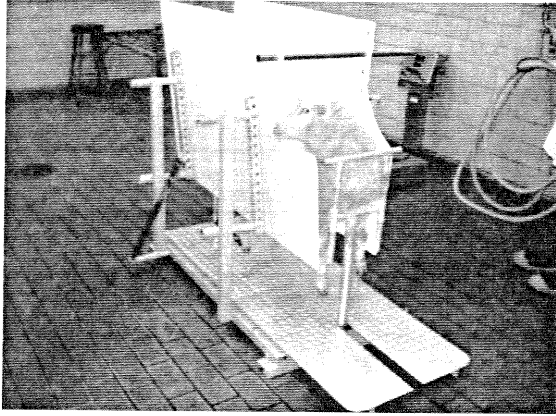
Thus far, the NESGM program has focused on sheep and goat producers in the twelve northeastern states, but it could easily (and should) be expanded to other production areas. The Northeast focus of the program is more related to market demand than production area. There is a tremendous demand for sheep and goat meat in the Northeast, and the region does not produce enough animals to meet this demand, so production often flows in from other parts of the country. Many states outside of the 12-state northeast region are interested in targeting the lamb and goat markets in NY, NJ, and PA. In addition, New York City, while still the best market for sheep and goat meat in the U.S., is a pilot project area. Much of what is learned in the New York City market can be applied to other U.S. cities where there exists an ethnic demand for sheep and goat meat.

The grant providing funding for the Northeast Sheep and Goat Marketing Program will expire on January 21, 2002. Regional Marketing Summits are planned in Fall'02/Winter'03 to determine how the program can continue to serve producers in the Northeast region and discuss the formation of a Northeast Sheep and Goat Marketing Association. Establishment of a regional sheep and goat marketing organization is a key objective of the original project proposal to USDA. Additional funding is being sought to continue funding for a marketing coordinator. Producers can help extend the efforts of the program by participating in the Regional Marketing Summits, by adding their names to the program mailing list, and by providing input to Cornell University, Susan and Chris, and/or the advisory board, all of which have contacts on the web site.

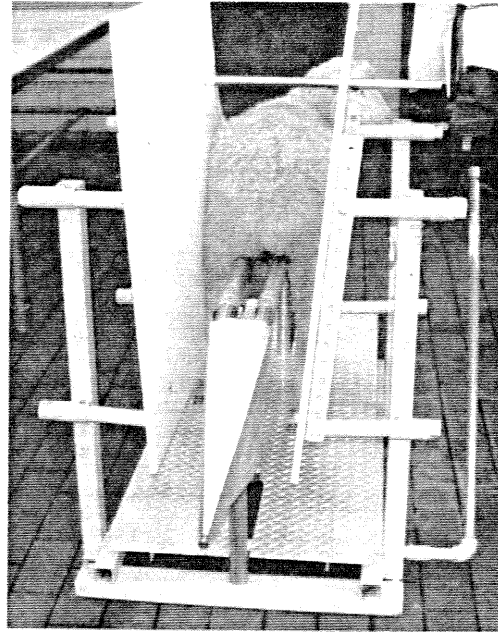
The dates and locations for the Regional Marketing Summits are (were) as follows:

- Saturday 14 December 2002 from 10 am to 2 pm at the Chichester, New Hampshire, Town Hall.
- Friday 10 January 2003 at Harrisonburg, Virginia in conjunction with the Virginia – North Carolina (Mid Atlantic) Shepherd's Symposium. The marketing summit will consist of a marketing panel followed by an open discussion with the NESGMP as the focal point. Both sheep and goat producers are urged to attend. For more info contact Susan Schoenian at (301)432-2767 ext 343 or ss80@umail.edu.
- Saturday 18 January 2003 at the Cornell Sheep Farm, Harford, New York in conjunction with the Quinterly Cornell Sheep Farm Field Day. Both sheep and goat producers welcomed. For more info contact Dr. Michael Thonney at (607)255-2851 or mlt2@cornell.edu.

Northeast Sheep and goat Marketing Program - www.sheepgoatmarketing.org



The NESGMP halal/kosher restraining device. Note that the feet of the lamb are off the ground and the lamb is supported by the double rails and the sides of the chute. Animals held in this manner remain very calm.



Northeast Sheep and Goat Marketing Program halal/kosher restraining device. View of lamb from the back of the restraining device. Note that the feet of the lamb are off the ground and the lamb is supported by the double rails and the sides of the chute. Animals held in this manner remain very calm.

Understanding USDA Payment Programs for Sheep Producers

Tom Covey, Farm Business Mgmt Agent
Virginia Cooperative Extension

Understanding USDA Payment Programs for Sheep Producers

Tom Covey
Extension Agent, Farm Business Management
755 Roanoke Street, Suite 1G
Christiansburg, VA 24073
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covey@vt.edu
January 2003

➤ Wool producers are now eligible to apply for either a nine-month nonrecourse marketing assistance loan or a Loan Deficiency Payment (LDP).

- Under the new program, producers have until January 31, 2003 to request LDP's for 2002-crop wool that has not been marketed and remains in storage. If LDP's are not requested, producers have until 1/1/03 to request loans for the 2002-crop wool.
- Each year thereafter, the period to request loans or LDP's will extend until 1/31 of the year following the crop year that the wool is sheared

Several special conditions also apply

- The farm bill authorized LDP's for the 2002-crop wool even though they had lost beneficial interest before the program was implemented.
- Producers who sold their wool before 10/11/02, may apply for LDP's through 1/1/03.

More special conditions

- Producers who sold their wool after 10/11/02 but before 11/4/02 were notified that they could still apply for LDP's through 12/6/02.
- Producers who did not sell their wool before 11/4/02, must have had beneficial interest to be eligible for the payment on the date they applied.

- Nonrecourse marketing assistance loans provide producers with interim financing on their production and facilitate the orderly marketing of the commodity throughout the year.
- Instead of selling the wool immediately after shearing, a nonrecourse loan allows a producer to store the production, pledging the commodity itself as collateral.

➤ The loan helps an eligible producer pay bills when they come due without having to sell the wool at a time of year when prices tend to be lower.

➤ To be eligible for the loan or LDP, a producer must be in compliance with wetland and highly erodible land conservation requirements.

➤ Ungraded wool offered as loan collateral will secure a loan made at a rate of 40 cents per pound.

➤ The repayment amount, per pound, will be announced each Tuesday.

➤ Instead of obtaining a loan, producers may request LDP's, with the LDP rate being the difference between 40 cents per pound and the announced repayment amount applicable during the week.

Graded Wool

➤ Special rules for graded wool.

➤ Bigger payments for graded wool.

➤ No place in Virginia to grade wool.

➤ Grading must include a core test result.

➤ A core test refers to a lab test where the diameter of the fiber is measured

2003 Wool Crop

- Although special provisions were in place in 2002, producers must maintain beneficial interest in the wool to receive program benefits in 2003 and subsequent marketing years.
- Remember producers are subject to the \$75,000 payment limitations per crop year.

LMAAP

- Lamb Meat Adjustment Assistance program
- Four year program started in 2000 to help stabilize the lamb market.
- Program cost \$67.7 million.
- Program helps producers compete with foreign competition in the marketplace.
- Producer must be in compliance with sodbuster and swampbuster provisions.

Three parts of LMAAP

- 1) Ewe lamb incentive program
- 2) Feeder lamb payments
- 3) Slaughter lamb payments

Ewe lamb incentive program

- Paid \$18 per head in 2002.
- Payment expected to be about the same in 2003.
- Will be paid on the number of ewe lambs retained during the period of 8/1/2002 through 7/31/2003.
- You must sign up by 8/15/2003.

Feeder lamb payments

- Feeder lambs must be marketed after 3/2/2002
- Must be owned from birth through marketing
- Pays \$3 per head.

Slaughter lamb payments

- Pays \$8 per head
- Must be marketed from 6/1 through 7/31
- In order to receive payment, slaughter lamb carcasses must be certified by a AMS agent.
- Carcass data must be collected.

Other 2002 Farmbill Provisions

- CREP - Conservation Reserve Enhancement Program
- For fencing livestock out of streams.
- 10-15 year period.
- Must plant trees and exclude livestock.
- Will cost share and pay annual rental payment.
- Annual rental payment is approximately \$70.

Other 2002 Farmbill Provisions

- EQIP - Environmental Quality Incentive Program.
- Similar to CREP.
- You don't plant trees.
- Cost share payment.
- No annual rental payment.

If you have questions.....

- Contact your local Farm Service Agency (FSA office)
- Visit FSA on the web at:
<http://www.fsa.usda.gov>

The Status of the Virginia Cooperative Coyote Damage Control Program - Fiscal Year 2002

Chad J. Fox, USDA, Animal and Plant Health Inspection Service,
Wildlife Services, 105 B Ponderosa Drive,
Christiansburg, Virginia 24073 -- phone 540-381-7387

EXECUTIVE SUMMARY

USDA-APHIS-Wildlife Services (WS) provided direct control services to 197 livestock farms in twenty-eight western counties in federal fiscal year (FY) 2002. This represents a 38% increase in the number of farms served from FY2001. During FY 2002, 234 sheep, 35 calves, and 120 goats were reported and verified killed or injured by coyotes in Virginia. This represents 25% increase in reported sheep predation, a 133% increase in reported calf predation, and a 25% increase in reported goat predation from FY2001. Continued federal funding in 2002 resulted in more staff to serve livestock producers with predation problems in Highland County, the Alleghany Highlands, and the Shenandoah Valley. This continued service resulted in a \$26,307 savings in reduced coyote predation to livestock producers in the Sixth Congressional District. WS has kept the average number of sheep killed by coyotes per farm to less than 3 per year for two consecutive years. In FY2002, the average number of sheep killed per farm by coyotes declined to 2 sheep. Preventative control was conducted on 125 livestock farms with historic coyote predation and WS removed coyotes before livestock depredation occurred, thus these farms had no losses in FY2002. In FY2002, WS removed 393 coyotes on farms to stop or prevent coyote predation on livestock.

Funding for FY2003 was reduced by \$50,500 by the Governor due to the state's budget crisis and reduced head tax revenue being collected on sheep. The loss of funding reduced the budget to \$177,500. The new 2003 budget includes \$40,000 from the Virginia Department of Agriculture and Consumer Services, \$121,000 from USDA-Wildlife Services, and \$16,500 from the Virginia Sheep Industry Board. Current funds provide for approximately 3 staff years in FY2003. Coyote specialist positions are located in, Highland County, the Alleghany Highlands and Shenandoah Valley, and part-time in the New River Valley and Southwestern Virginia. The budget cuts will reduce the availability of services in Southwestern Virginia by 75% and the New River Valley by 25%.

Increasing requests for service and an expanding coyote population are placing increased demands for more service to assist livestock producers and accomplish program goals to reduce coyote, dog, and fox predation on livestock. Many of the new demands for service are from south-central Virginia (Prince William, Nottoway, Powhatan, Halifax, Appomattox, and Charlotte Counties) where no direct control services are provided. To meet the current demand for services the Virginia Cooperative Coyote Damage Control Program in the Western District requires an additional 3 staff years.

INTRODUCTION

The United States Department of Agriculture - Animal and Plant Health Inspection Service - Wildlife Services (WS) serves Virginia livestock producers suffering coyote predation on livestock by providing technical assistance, direct control, education, and research. This status report summarizes WS's accomplishments, funding, and goals during FY2002 in each of these areas.

Coyote depredations were recognized as a potentially serious threat to Virginia's livestock industries in the early 1980's. As a result, the Virginia Cooperative Coyote Damage Control Program(VCCDCP) was created in 1990 by a Cooperative Service Agreement between the Virginia Department of Agriculture and Consumer Services (VDACS) and WS. The VCCDCP is funded by sheep producers and state and federal funding (Table 1). The program provides necessary technical and operational assistance in identifying, controlling, and abating coyote predation to livestock.

The VCCDCP uses and recommends an Integrated Predator Management (IPM) approach to solving livestock predation problems. This approach to predator management uses improved husbandry practices, predator resistant fencing, predator frightening devices, livestock guardian animals, and predator removal. The implementation of IPM on Virginia farms was accomplished through technical assistance, educational programs, and operational programs.

Table 1. Sources of funding for the Virginia Cooperative Coyote Damage Control Program in Federal Fiscal Year (FY) 2002 (October 1, 2001 - September 30, 2002) and FY 2003 (October 1, 2002 - September 30, 2003).

<u>Source</u>	<u>FY2002</u>	<u>FY2003</u>
Virginia Department of Agriculture and Consumer Services	\$85,000	\$40,000
VA Sheep Industry Board	\$22,000	\$16,500
United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services	\$121,000	\$121,000
<u>Total</u>	<u>\$228,000</u>	<u>\$177,500</u>

PROGRAM ACCOMPLISHMENTS

Technical Assistance

Technical assistance was provided to producers through personal consultations on the farm and written/telephone consultations. Coyote predation management information was disseminated to 208 producers. WS provided 128 leaflets on using guard animals, non-lethal and lethal methods producers can implement, and information to evaluate predator killed livestock.

Direct Control Services

During Federal Fiscal Year 2002 the VCCDCP provided direct control services to 197 livestock producers reporting livestock losses to predation or livestock producers with historic losses (Table 2). WS provided direct control services to 113 sheep farms, 71 cattle farms, and 13 goat farms in FY2002.

The VCCDCP uses preventative control which removes coyotes before losses occur because it minimizes overall livestock losses to predators. Preventative control is implemented primarily from January through April. Of the 197 livestock producers assisted, 125 farms with historic coyote predation losses had coyotes removed to prevent livestock predation. These 59 sheep farms, 61 cattle farms, and 5 goat farms with historic coyote predation losses received preventative control services. These farms had no livestock killed by predators in FY2002.

Corrective control is the implementation of coyote removal methods after the livestock producer reports losses. Corrective control was implemented at 69 farms to stop chronic coyote predation on livestock in FY2002. This represents an 8% increase in farms reporting losses from FY2001.

Table 2. Livestock depredations reported to or verified by Wildlife Services on farms receiving assistance from the Virginia Cooperative Coyote Damage Control Program in FY2002 and FY2001.

<u>Resource</u>	Total livestock killed/injured by coyotes <u>in FY2002</u>	No. of farms reporting losses in <u>FY2002^A</u>	Total livestock killed/injured by coyotes <u>FY2001</u>	No. of farms reporting losses in <u>FY2001</u>
Sheep	234	54	187	43
Cattle	35	10	15	13
Goats	120	8	96	16

A. Three farms reported a combination of sheep, cattle, or goat losses.

Methods used by WS

Integrated Predator Management is the use of any or all practical and legal methods simultaneously or sequentially. Livestock producers are better able to implement non-lethal methods such as fencing, shed lambing, and husbandry. Livestock producers can implement some lethal methods, however, they request assistance from WS when the predation can not be stopped.

WS primarily implements a mix of lethal methods to alleviate predation on livestock at the livestock producers request (Table 3). Coyotes may be removed by WS using snares, leghold traps, modified padded-jaw leghold traps, shooting, calling and shooting, decoying with dogs and shooting, M-44 sodium cyanide ejectors, or Livestock Protection Collars.

M-44's are the primary method used for preventative control because of efficiency and effectiveness at stopping or preventing predation. Also, M-44's are better able to continuously work during bad weather and freezing and thawing soil conditions which can disable traps and snares.

Where appropriate, WS uses non-lethal methods to resolve livestock predation. Infrequently, strobe-sirens, a non-lethal method, are used until lambs are moved to market or lethal methods can be implemented. Sometimes WS assists in the placement of guard dogs to protect livestock.

Table 3. Lethal methods used by Wildlife Services and coyotes removed to protect livestock from predation in Virginia. Direct control services were conducted on 197 farms during FY2002.

<u>Method used</u>	<u>Number of farms method was used</u>	<u>Number of coyotes captured per method</u>
M-44	146	252 (64%)
snares	79	77 (20%)
leghold traps	56	63 (16%)
Livestock Protection Collar	7	1 (.002%)
calling and shooting	6	1 (.002%)

Sheep

WS has been able to consistently keep sheep losses to an average of approximately 5 or fewer sheep per farm for six consecutive years (Table 4). These lower sheep losses are primarily due to the implementation of preventative control, use of M-44's, and prompt reporting by sheep producers. The average number of sheep killed by coyotes per sheep producer receiving WS assistance during FY2002 was 2.1 sheep/farm.

Table 4. Average number of sheep killed by coyotes per sheep producer on farms receiving assistance from the Virginia Cooperative Coyote Damage Control Program 1993-2002.

	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>
Sheep killed	404	363	191	402	250	229	448	337	187	234
Sheep producers assisted	24	41	28	56	49	72	84	67	83	113
Sheep killed/farm	16.8	8.8	6.8	7.2	5.1	3.2	5.3	5.0	2.3	2.1
number of coyotes removed to protect all livestock	19	56	37	75	115	129	284	204	231	394

Lambs Taken by Coyotes in FY 2002

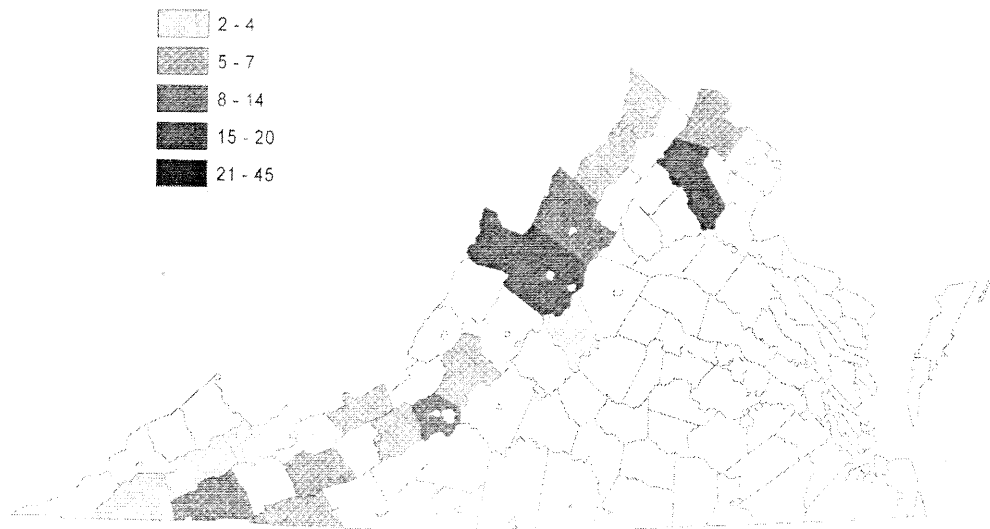


Figure 1. Number of lambs per County killed by coyotes in FY2002.

Goats

Goat losses on farms which reported goat predation by coyotes in FY2002 increased 25% from FY2001. The number of goats killed by coyotes was reduced from an average of 9 goats per farm in FY2000 to 6 goats per farm in FY2001, and to 6.3 goats per farm in FY2002. Seventy-eight percent of goat losses in FY2002 occurred in Southwest Virginia.

Cattle

Cattle losses on farms which reported calf predation by coyotes in FY2002 increased 133% from FY2001. Of the 71 cattle farms assisted in FY2002 only 16% received corrective control. Eighty-four percent of the cattle farms serviced received preventative control because cattle producers felt coyotes were a threat, coyotes were seen harassing or chasing cattle, or coyotes killed cattle, sheep, or goats on adjacent property.

Calf predation by coyotes is a growing concern among producers, particularly in southwest Virginia and increasingly in the Piedmont. Seventy-one percent of all cattle losses reported to WS were from southwest Virginia in FY2002. The National Agricultural Statistics Survey (NASS) of cattle predator loss indicated an increasing number of coyote/calf predation in Virginia from 700 calves in 1991 to 900 calves in 1995 to 1,100 in 2000 (Figure 2). A recent NASS survey of only WS clients reported 95 cattle killed by coyotes on 174 cattle farms in 1998. Current funding levels limit the ability of the program to respond to this increasing demand for service from cattle producers.

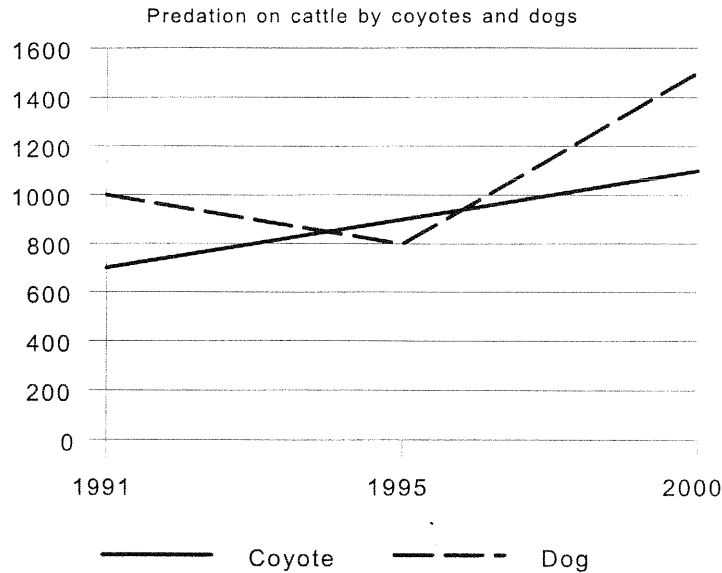


Figure 2. National Agricultural Statistics Service (NASS) estimates of cattle losses from coyotes and dogs in Virginia.

Impacts on coyote populations

Direct control services resulted in the removal of 394 coyotes by WS personnel during FY2002 compared to 231 coyotes removed in FY2001 (Table 4). While this was an increase in the number of coyotes removed by WS, the overall reported livestock losses also increased 25% for sheep, 25% for goats, and 133% for cattle from FY2001.

Coyote populations in Virginia continue to grow each year. WS assisted 573 different livestock producers with coyote predation from 1990 - 2002. In FY2002, an additional 86 new farms were assisted with livestock predation. As coyote populations continue to grow in Virginia more farms will ask for assistance with predation problems. Similar increases in coyote harvest have been documented by hunter harvest surveys made by the Virginia Department of Game and Inland Fisheries (Figure 3). The coyote harvest has increased from 1,295 in the 1993-94 hunting season to over 6,000 in the 1998-1999 hunting season.

Education

The VCCDCP has used the media as a means of educating livestock producers and the public. Five newspaper articles were published. WS also conducted 15 educational programs to educate livestock producers and the public about coyote damage management activities. Fifteen educational programs were presented and attended by 450 people and 1,562 informational leaflets about livestock protection were distributed at these programs (Table 5).

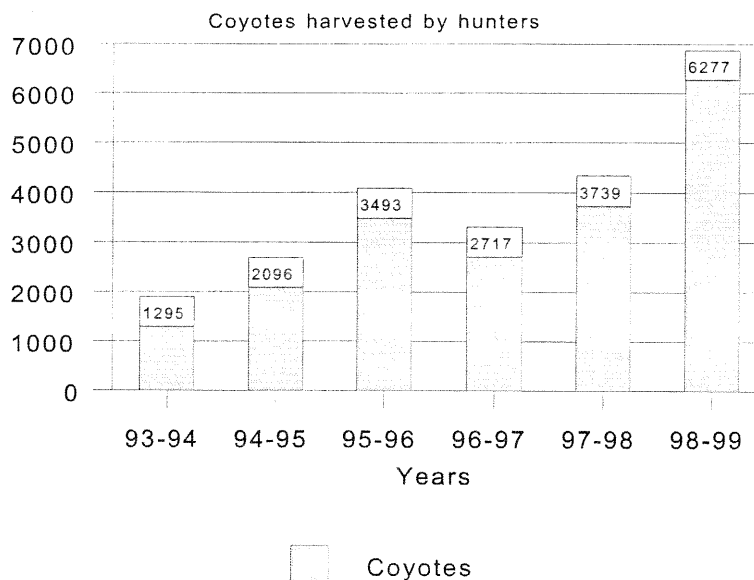


Figure 3. Number of coyotes harvested by hunters in Virginia during recent hunting seasons.

Table 5. Educational programs presented by WS personnel under the Virginia Cooperative Coyote Damage Control Program in FY2002.

<u>Requests Cooperator/Organizations/Governments</u>	<u># of Participants</u>
Virginia Extension Service Meat Goat Seminar	23
New River Valley Wool Pool	22
Shenandoah County Extension	4
Shenandoah County	22
Shenandoah County Board of Supervisors	15
Virginia Tech Farm and Family Showcase	60
Floyd County Extension	3
VSIB/Virginia/NC Shepherds Symposium	20
Augusta County Sheep and Wool Producers	17
Warren County Extension	4
USDA Forest Service	20
Buffalo Gap High School FFA	80
Augusta Training and Technical Education Fair	120
Master's of Foxhounds	40
Total for FY2002	450

Research

Seven Livestock Protection Collar (LPC) projects were conducted by Virginia WS personnel during FY2002 to reduce coyote predation losses on sheep. LPC's are used in limited situations under specific conditions. During FY2002, these conditions for the efficient use of the LPC occurred on only one farm.

Specific conditions for successful use of the LPC include; other control methods fail to stop predation, a predictable coyote, all sheep (20 to 50) are collared in a high risk pasture, and all other sheep are moved to a secure location.

The LPCs were placed on 86 sheep over seven projects for an average of 12 head of sheep per project (range: 7-20). Of the 86 collared animals one was attacked by coyotes solving the immediate predation problem on that farm. The six other farms where LPC's were used, predation on sheep by coyotes was stopped by a combination of other control methods before any LPC's were punctured.

Even though LPCs accounted for .002% of all coyotes removed by Virginia WS personnel during FY2002 they are a valuable tool and provide a selective and effective method to the integrated coyote management program conducted by Virginia WS. In the past, some coyote predation problems would have been difficult and time consuming to solve without LPCs. LPC's can be invaluable due to livestock interference with other methods, concerns adjacent landowners have about some methods, and concerns for pet dogs or guard dogs.

FUNDING

During FY2002 there were 3 full-time coyote specialists and one part-time coyote specialist. Due to the state budget shortfalls the full-time specialist located in Russell County serving 12 southwest Virginia Counties will work only three months (January through March) in FY2003. The full-time specialist located in Highland County will continue to serve primarily Highland County, and the full-time specialist located in Augusta County will continue to serve 10 Shenandoah Valley region counties. The part-time coyote specialist located in Montgomery County serves 8 counties in the New River Valley.

The increase in staff years in Virginia's Sixth Congressional district continued to directly result in a reduction in coyote predation/livestock losses in Highland County and the Shenandoah Valley (Table 6). Livestock losses in Southwest Virginia continued to decline and losses in the New River Valley region increased. Monetary damages from reported livestock predation were reduced from \$70,120 in FY2000 (date prior to increased federal funds) to \$35,787 in FY2002.

Table 6. Value of livestock lost to coyote predation by county in Virginia during Federal Fiscal Year 2002 compared to Federal Fiscal Year 2000 (date prior to increased federal funding).

<u>County</u>	<u>FY2002 (\$)</u>	<u>FY2000 (\$)</u>	<u>Benefit</u>
Alleghany Highlands			
Highland	3,006	11,880	8,874
Augusta	4,722	20,500	15,778
Bath	200	1,500	1,300
Rockingham	1,520	2,075	555
Rockbridge	1,025	330	-725
Shenandoah	300	0	-300
<u>Frederick</u>	<u>375</u>	<u>1,200</u>	<u>825</u>
subtotal	11,148	37,485	26,307
Southwest Region			
Bland	260	450	190
Buchanan	400	2,910	2,510
Dickenson	500	3,185	2,685
Grayson	1,334	1,650	316
Lee	1,600	455	(-1,145)
Russell	2,060	8,025	5,965
Scott	625	3,400	2,775
Smyth	0	900	900
Tazewell	260	1,000	740
Washington	6,810	4,965	(-1,845)
Wise	955	2,375	1,420
Wythe	<u>1,405</u>	<u>390</u>	<u>(-1,015)</u>
sub-total	16,209	29,705	13,496
New River Valley			
Botetourt	650	0	(-650)
Carroll	0	690	690
Floyd	0	0	0
Giles	7,800	450	(-7,350)
Montgomery	630	430	(-200)
Nelson	0	1,360	1,360
Pulaski	<u>0</u>	<u>0</u>	<u>0</u>
sub-total	8,430	2,930	(-6,190)
TOTAL	35,787	70,120	33,613

GOALS FOR FY2003

All farms requesting WS assistance will be responded to within 3 business days. Any farm in Highland County with a predation problem will be responded to within 2 days when the wildlife specialist is on duty. This assistance will be returning the phone call and arranging a site visit to evaluate the predation problem.

Sheep losses will be held at an annual average of 5 or fewer animals lost per farm. WS has met this goal four of the last five FY years (1998, 2000, 2001, and 2002) (Table 4). The predation rate in Highland County will be held at an average loss of three sheep killed per farm.

Due to the recent state budget cuts livestock predation management goals in southwest Virginia will change. WS will continue to return phone calls, and provide technical assistance and education programs, however, direct control services will only be available from January through March. January through March services were chosen to take advantage of removing territorial coyotes before they have pups which decreases the predatory behavior of coyotes during the lambing season (Wagner and Conover 1999).

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Biosecurity

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Interestingly, when I type in the word “biosecurity” into my computer, the spell checker underlines it in red to inform me that I have misspelled the word as this word is not in the computer’s dictionary. This same phenomenon occurs when I am making handouts for classes and use terms and conditions that apply to veterinary students. It surprises me that biosecurity falls into that “obscure” category when the principles of biosecurity have been around for years and are really the cornerstone of all preventive health programs.

Biosecurity: is a word that describes programs for the control of infectious diseases by reducing and or preventing the new introduction of disease on to a farm and by reducing and or preventing the movement of diseases between groups of animals.

Essentially what one is attempting to do is control the spread of pathogens. Pathogen can be defined as any infectious agent that causes disease, in our case diseases that occur in sheep.

Why is biosecurity important?

Pathogens that enter or circulate within animal populations may have a devastating effect on animal performance and consequently cash flow. In the case of the introduction of a foreign disease pathogen, such as Foot and Mouth Disease, not only would the entire herd be devastated but the whole industry of animal production would be negatively impacted.

The greatest disease threat to a sheep is from another small ruminant, whether through direct contact or through surfaces, equipment or people contaminated by diseased animals.

There are some diseases that can be easily observed, for example pneumonia and diarrhea. Animals that are affected with these 2 maladies can be removed from the rest of the herd or in the case of bringing new animals to the farm, avoided. Although clinically ill animals present a threat to the health of the herd, animals that are in the very early stages of disease and not showing symptoms are a bigger threat. Like many things in life, if you can’t see it, it isn’t a problem but we all know that is not the case. Just think about food poisoning. We never see the pathogen in the food we eat yet we certainly suffer from the consequences of its presence. There are many pathogens that sheep can harbor without being visible until the last stages of the disease state.

Because non resident animals are the biggest threat to the resident animal population in regards to pathogen spread, it is important to develop a plan to reduce that risk. In the development of a plan to reduce disease risk, common sense must prevail! There is no point in developing a restrictive plan if it can not be implemented. Likewise, if a plan is put in place

and then violated the plan really doesn't exist. For example, a farm doesn't allow visitors, yet the owner purchases animals from a stockyard and places them directly into the herd.

Pathogens are spread among animals and populations thru:

- a) Animal to animal contact.
- b) Shedding of the pathogen in the fecal material which contaminates the environment.
- c) Respiratory secretions and movement through the air.
- d) Body secretions (nasal discharge, urine, draining abscesses, uterine fluids) contaminate the environment.
- e) Parasites, such as lice, mites, ticks, can carry pathogens
- f) Fomites – articles that are shared between animals; for example a hair brush, clippers.
- g) Feed – pathogen gets into the feed and then animals consume the feed.
- h) Water – acts as a central source of the pathogen or pathogen could be carried in via water as in the case of a stream.
- i) Feet (clothing, shoes, hands), the pathogen is “carried around”.
- j) Wildlife

Methods to control the introduction of pathogens

- 1) Closed farm
 - no animals are brought into the farm
 - if animals leave the farm, they are not allowed to return. For example – no show animals.
 - no people are allowed to enter the farm and have contact with animals
 - not very practical for a farm that is trying to develop genetic diversity or increase animal numbers
- 2) Bring in only healthy animals and people
 - animal is healthy
 - although apparently healthy, the animal could be infected but is not yet showing clinical signs.
 - the animal may have already had clinical signs of the disease but is now healthy. However the animal still carries the pathogen, a reservoir.
 - the animal (people) has picked up a pathogen and is just transporting it.
- 3) Inspect the animals closely, the ones you are interested in and others on the farm
 - are they in good body condition
 - do they have a nice coat
 - what condition are their feet/hooves and legs in
 - make the animals move, do they cough, increase in the respiratory rate
 - body fluids - fecal output, vaginal discharges, nasal secretions, udder

4) Buy from a known source of animals.

- ask if any animals have experienced diseases, if so what kind – don't be shy; these new animals you are purchasing have the potential to destroy your flock.
- are there any disease problems currently or have there been in the past.
- what kind of health program do the animals receive, is it similar to yours?
- how many new animals has this individual purchased in the past year, sources of those animals – if animals have been purchased within the past 2-3 weeks, hold off in buying animals as the new animals could have brought in a pathogens that is brewing in the resident herd.

5) DO NOT BUY FROM THE SALE BARN

- why are those animals there?
- animals from multiple sources.
- animals have been in an environment that has had thousands of animals pass through, not only small ruminants but most likely cattle and horses.
- animals may have passed through several stockyards before coming there. This moving around increases exposure and susceptibility to pathogens.
- How do the above differ from going to a show or fair grounds?

6) Quarantine

- all animals entering the farm should be quarantined. This includes animals that leave the farm for breeding or exhibitions – shows or fairs.
- there are two major reasons to place an animal in quarantine upon entry on to the farm.
 - a) protect the animals that are already on the farm (resident population) from disease pathogens that may be carried by the new or returning animal.
 - b) protect the new or returning animal from acquiring infections from the resident animals.

Animals that are transported are under stress. This stress weakens the immune system and renders the animal susceptible to infection. Some pathogens live “normally” in the animal and wait for an opportunity to cause disease. It is during these times of stress, that opportunistic pathogens produce disease. Likewise, stressed animals secrete higher numbers of pathogens that results in contamination of the environment that could infect the resident animals. Obviously if the new animal brings in new pathogens that the resident flock has not encountered before, the resident animals lack immunity and therefore succumb to disease. Placing animals in quarantine allows closer observation of new animals in case a disease condition occurs in which case early treatment can be administered. While in quarantine, new animals can acclimate to the feed, water and “rest” from their recent trip. This allows them to be better prepared to withstand the pathogen challenges as well as other challenges it will face when first entering the herd.

Quarantine animals before mixing with resident animals

- place animals away from the rest of the herd – 30 yards – or as far away as possible.*
- don't place animals in a place that is used by the herd, like a kidding barn.*
- attend to these animals last after dealing with resident animals*

- change cloths, shoes or wear disinfectable boots, after handling animals
- WASH YOUR HANDS, between handling groups of animals*
- keep isolated for 30 days*
- serology testing
 - OPP, Johnes, Caseous lymphadenitis
- trim feet,* soak feet in a sodium sulfate solution for 20 minutes.
- vaccinate so the new animals are vaccinated with the same vaccines as resident animals
- inspect animals for abnormal conditions before releasing*
- deworm animals upon entry into quarantine and as they exit.* Use 2 different classes of dewormers together, for example a white drench, levamisole, or an ivermectin.
This is extra label usage and should only be done under the direction of your veterinarian.

3. Equipment

Equipment may act as a vehicle to bring disease to your animals

- when purchasing new animals, the vehicle should be cleaned prior to placing animals in it, especially if you are borrowing someone else's vehicle.
- truck tires may carry fecal material and disease agents. Keep this in mind if your vehicle goes on a premise that is a high traffic area for animals. For example a sale barn, slaughter facilities, shows.
- halters, grooming equipment, foot trimmers should be cleaned and disinfected between animals.

4. Animals

a) Wildlife

Wildlife may present an opportunity for the transmission of disease. Raccoons can carry rabies. Deer carry the deer worm. Rodents carry a variety of diseases transmissible to sheep. Keep grain contained. Waterfowl may contaminate water sources if a pond or stream is used as the primary source for water.

b) Pets

Cats may carry toxoplasmosis, a disease that causes abortion. The organism is transmitted through the cat's feces. Keep cats out of feed, off of hay bales.

5. People

Humans can bring disease agents to your farm.

- a) Ask if they own sheep, or other animals.
- b) Ask if they have visited any farms lately.
- c) Ask if they have been to a foreign country within the past 5 days, did they wear any of the cloths that they have on now in that country.
- d) Inspect their shoes. Shoes are a great means by which disease agents can be spread from one locality to another.
 - dip shoes in disinfectant foot bath
 - provide boots
- e) Shows – people pet one animal and then pet another

Biosecurity within the farm

- 1) Work with the youngest of stock first and work your way through to the oldest and then those in quarantine. Most pathogens that baby or young animals acquire are acquired through older animals. By dealing with the young first, one reduces the chance of spreading disease agents.
- 2) Disinfect equipment between classes or groups of animals. Ideally there should be a rake/shovel, broom, or whatever equipment is used for each building or livestock group.
- 3) If there are sick animals, isolate them. Treat them after you have taken care of the other animals. Change cloths and wash hands after taking care of sick animals.
- 4) Water sources.
 - if water is acquired through a stream, what is up stream that may affect your animals?
 - Pond water, fence off.

Successful Ewe Lamb Development, Breeding, and Lambing
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Successful development, breeding, and lambing of ewe lambs is one of most important tasks of the shepherd. Compared to mature ewes, ewe lambs require more management. Specifically, proper management of replacement ewe lambs from birth through first lambing is critical to overall flock productivity and profitability. These proceedings will focus on several areas of ewe lamb management.

Ewe Selection

In most breeding systems, replacement ewe lambs will be generated from within the flock. Therefore, attention to maternal traits in the rams siring potential replacements is critical. Additionally, preference should be given to crossbred ewe lambs. Crossbred animals have two major advantages over straightbred animals: 1) Crossbred animals exhibit *heterosis* (hybrid vigor), and 2) Crossbred animals combine the strengths of the breeds used to form the cross (breed complementarity). Crossbred females are superior to straightbreds for reproductive performance due to advantages received from heterosis. Crossbred ewes exhibit significant advantages in fertility, prolificacy, and lamb survival resulting in advantages of up to 18% in pounds of lamb weaned per ewe exposed compared to straightbred ewes. From the existing pool of potential replacements, the following are important considerations for selection:

- 1) Performance Record: Ewe lambs should be retained from highly productive dams. Identifying these dams through a record-keeping system is therefore the first step in identifying potential replacements. Dams that lamb early in the lambing season, produce multiple births, and excel in pounds of lamb weaned (reflective of milking ability) are the best candidates to produce replacements. In the absence of such records, identifying maternal potential in ewe lambs based solely on visual appraisal is difficult.
- 2) Age: Preference should be given to ewe lambs born early in the lambing season (first 50 days). These ewe lambs are more likely to reach puberty earlier, breed, and lamb early as yearlings- thus keeping the subsequent lambing season short. Older ewe lambs are also more likely to reach target body weight by their first breeding season than young ewe lambs, and this coupled with age enhance their ability to breed as ewe lambs.
- 3) Conformation/Soundness: As previously discussed for rams, structural soundness and mouth soundness are also critical in ewe lambs. Additionally, ewes with adequate body capacity and muscling are preferred. Appropriate frame size is important as it relates to mature size. As mature size increases, so do nutritional requirements and thus carrying costs.

Nutrition & Management

Nutrition from birth to first lambing has an influence on the lifetime productivity of the ewe. Ewe lambs should be in production by the time they are 12 to 14 months of age, as ewes that lamb first as yearlings rather than two year-olds have higher lifetime production. Ewe nutrition is a very important aspect of total flock management. Proper nutrition of ewe lambs

is necessary to optimize productivity. There are five factors that affect the nutritional needs of the ewe, specifically:

1. Age, because young ewes are still growing their requirement for certain nutrients is higher
2. Size, or more importantly, body weight
3. Body condition (amount of body fat)
4. Stage of production (maintenance, gestation, or lactation).
5. Level of production (how much milk, how many fetuses are carried, etc.)

Additionally, health status (including parasite load), activity level, weather, and other environmental factors may also influence nutritional requirements and management. 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. Also, ewe lambs consume less feed per day than mature ewes of the same body weight.

To determine when and how much to feed the flock, we must know the animals' requirements for nutrition. These requirements are affected by the 5 factors listed above, and are found in Tables 1. There are 4 key nutrients of concern in feeding the ewe flock. Those are energy (expressed as TDN, which stands for Total Digestible Nutrients), protein, Calcium, and Phosphorous. Vitamins A & E are important, but as long as the ewe is eating green forage (hay or pasture) these vitamins are usually consumed in adequate amounts. In Table 1 are shown amounts of specific nutrients needed by an animal each day. Bigger animals need more than smaller animals, thus this table shows animals of different weights.

Pre-Breeding: Ewe lambs should be targeted to reach 70% of their mature weight at breeding. Therefore, most ewe lambs should weight 100-150 pounds at breeding. Winter born ewe lambs generally have early rapid growth resulting from creep feeding and grain diets prior to forage being available. Winter born ewe lambs that will be kept for flock replacements should be prevented from becoming excessively fat. Excess fat deposition has been shown to reduce future milk production. Development of these winter-born ewe lambs is best accomplished through pasture grazing and additional grain supplementation as needed to enhance gains. Early and late spring born lambs traditionally are developed primarily through forage-based systems. Potential replacements should be identified and weaned so they may be properly grown and managed. These ewe lambs may need to receive supplemental corn or barley (.5-1.5 lb./head/day) to achieve daily gains needed to reach target body weight prior to breeding. The amount of supplement needed will vary with forage quality and availability, as well as anticipated breeding date. As forage quality and availability declines during the summer, supplemental grain feeding will become necessary if breeding dates are early. Shearing of replacement ewes will enhance growth rates during the hot summer months. An effective deworming program is also crucial for optimum gains.

Breeding: Flushing is the practice of increasing energy intake, and therefore body condition, during the 10-14 days prior to breeding. This practice has been shown to be effective in increasing ovulation rates, and thereby increasing lambing percentage by 10-20%. With ewe lambs, 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). 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 an as-fed basis, a 130 lb. ewe lamb eating 3.5 lbs./day of this hay would consume 1.75 lb. TDN and .42 lb. crude protein. The requirements for this ewe in Table 1 are 2.0 lb. TDN and .35 lb. protein daily (57% TDN and 10.0% protein). Note that she requires .25 lb. more TDN than supplied, and her protein intake exceeds the requirement. This shortage in TDN can be supplied by .30 lb. of corn (.30 lb. x 80% TDN = .24 lb. TDN). Additionally, a ewe given the opportunity to consume as much of this hay as she desired may consume considerably more than 3.5 lb. per day (ewes can consume 3.5% of their body weight), and easily meet her requirements for both energy and protein. 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 intake. 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 pregnancy. This means a ewe will gain from 10 to 20 pounds during this time period. As a result, the nutritional requirement of the ewe for both energy and protein increases. Table 1 shows that TDN requirements increase to 65%, compared to 57% for early gestation. Similarly, protein requirement increases to around 11.5% compared to 10%. 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 is important to ensure adequate nutrition. Since ewe lambs are frequently managed as a separate group from the mature ewes, providing extra nutrition during gestation is easily attainable.

Lactation: Growth rate of lambs from birth to weaning is largely determined by milk production of the ewe, which emphasizes the importance of 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 are at the highest level of the whole production cycle of the ewe. 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. Feeding ewe lambs 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. Maintaining ewe lambs as a separate management group from mature ewes during lactation is 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. Of course, facilities and labor will dictate feasibility of this management practice. As mentioned previously, milk 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. High quality grass-legume pasture can satisfy the requirements for both energy and protein of ewes in early lactation. Management to ensure adequate forage availability is crucial, along with free-choice availability of a properly formulated free-choice mineral supplement.

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.

Table 1. Daily Nutrient Requirements of Ewe Lambs^a

Stage of Production	Body Wt.		DM Intake/day ^b (lb.)	Energy TDN (lb.)	Protein (lb.)	Ca (g)	P (g)	Vit. A (IU)	Vit. D (IU)	Vit. E (IU)
	(lb.)	Wt. gain or loss (lb.)								
Pre-breeding	66	.50	2.6	1.7	.41	6.4	2.6	1410	166	18
	88	.40	3.1	2.0	.39	5.9	2.6	1880	222	21
	110	.26	3.3	1.9	.30	4.8	2.4	2350	277	22
	132	.22	3.3	1.9	.30	4.5	2.5	2820	290	22
1 st 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 (100-120% lamb crop)	110	.35	3.5	2.2	.42	6.3	3.4	4250	277	24
	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 (1 st 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

^aValues adopted from National Research Council for Sheep, 6th Ed.

^bTo convert dry matter to an as-fed basis, divide by percent dry matter.

Ewe Lamb Vaccination Program

Prepartum vaccines

1. Ewes should be vaccinated 3 to 4 weeks prior to the time of parturition in order to provide colostral immunity to the neonates.
 - a) Clostridium perfringens type C and D
 - vaccine will cross protect against Cl. perfringens type B
 - vaccine prevents hemorrhagic enteritis and overeating disease
 - b) Clostridium tetani
 - protects neonates from tetanus
 - especially important if horses have been/are on the premise
 - neonates at risk because of tail docking, castration, and dehorning

Note: the Cl. perfringens C and D and tetanus come in a combination vaccine

- c) Parainfluenza 3
 - protects against parainfluenza 3, a viral disease that predisposes neonate to pneumonia
 - the product contains both PI3 and Infectious Bovine Rhinotracheitis Virus
 - the product is given intranasally, 1/2 of the cattle dose – 1 ml in one nostril
 - reduces the shedding of PI3 by dams and provides good colostral immunity to neonates

Optional vaccine

1. Clostridial 8 way vaccine
 - I don't recommend because of the reaction that this vaccine causes, eg. abscesses, fever, malaise. This may cause the dam to go off feed and develop pregnancy toxemia.
 - vaccine contains Cl. chauvei, septicum, novyi, hemolyticum, perfringens C and D, and tetani
 - except for perfringens C and D, and tetanus the other agents rarely cause problems in sheep and goats. One may encounter Cl. novyi, Black's Disease or Necrotic Hepatitis, if animals are infected with flukes.
 - vaccine should be given in the axillary space because of tissue reaction.

Prewaning vaccines

1. Lambs need protection against Cl. perfringens C and D because of feed changes and introduction to concentrates
2. Lambs need a series of 2 injections given approximately 2 to 4 weeks apart.
3. Lambs receive the first vaccine 2 weeks prior to weaning and the second vaccine, booster, at the time of weaning or shortly afterwards.
4. The combination Cl. perfringens C and D and tetani vaccine is used.

Prebreeding vaccines

1. Vaccine is used to protect dams from aborting so need to administer 30 days prior to introduction of the males and 60 to 90 days later.
 - a) *Campylobacter fetus* subsp. *intestinalis* and *jejuni* vaccine (*Vibrio* vaccine)
 - Vaccinate 30 days prior to introduction to rams. ewe lambs need a booster 3 weeks after the first injection and then again
 - Booster at females 60 –90 days later first injection, a total of 3 vaccinations for ewe lambs
 - b) *Chlamydia psittaci* vaccine
 - ewe lambs and ewes vaccinate 60 days and 30 days prior to introduction of males.
 - vaccine has variable results and periodically goes off the market.
 - c) *Clostridium* 8 way for the ewe lambs and doelings 60 and 30 days prior to breeding **if** this vaccine is used.
 - booster ewes and does 30 days prior to breeding

Rams– CD and T yearly booster

- Foot Rot vaccine at the time administered to adult females

Other vaccines used in small ruminants

1. Foot Rot vaccine
 - a) can be used as a preventive as well as part of the treatment protocol.
 - b) should be given prior to the time of year in which foot rot prevalence is the highest. This is usually during wet times of the year – eg. late winter/spring.
 - c) use the foot rot vaccine for sheep (FootVax)– contains strains against *Dichellobacter nodosus* (*Bacteroides nodosus*)
 - d) vaccine administration
 - Initially vaccinate and then repeat in 6 to 8 weeks
 - Does cause a high rate of abscessation
2. Contagious ecthyma or Orf vaccine
 - a) do not use unless orf is on the property
 - b) vaccinate replacement animals around 8 months of age, immunity lasts approximately 3 years so may need to revaccinate older animals
 - c) is a live vaccine that is infectious to humans, wear gloves
 - d) vaccine administration
 - must disrupt the skin surface
 - scarify the skin in the axillary space
 - paint vaccine on with a cotton swab
 - e) some recommend vaccinating neonates at 2 –3 days of age in the axillary space if a real problem in neonates

3. K 99 E. coli vaccine

- a) vaccinate with the same schedule as CD and T prelambling
- b) use if problem with E. coli scours

4. Rabies

- a) expensive but may be indicated in areas endemic for rabies or in high value animals
- b) there is a 3 year vaccine

Parturition/Lambing

- 1st stage of labor the ewe will often paw the ground, separate themselves from the rest of the flock, bleat and try to turn around to smell vaginal area. First time lambers the 1st stage of labor will last up to 12 hours, ewes have a shorter period. The purpose of this stage of labor is to dilate the cervix and the surrounding tissues to allow for the passage of the lamb. The lamb also becomes engaged in the pelvis.

- 2nd stage of labor lasts about an hour or less. This phase is what most people consider “labor”, straining by the ewe and expulsion of the lamb. Ewe lambs may push for an hour prior to presentation of the feet. If after an hour of straining no fetal parts are seen, a vaginal exam should be performed. Once fetal parts are seen, the lamb should be born within 30 – 45 minutes. If the lamb is not born within that time, assistance is indicated. Twins are born 20 to 30 minutes after the first lamb. Ewes will get up and down a lot during this stage of labor, and some may deliver by lying on their sides with their heads lifted off the ground.

- 3rd stage of labor consists of the expulsion of the placenta, usually within 4 hours of the birth of the lambs. The placenta is considered to be retained if it is not passed within 8 hours of birth. Ewes that retain the placenta are at increased risk of developing metritis, a uterine infection. The most common signs of metritis are depression, lack of appetite and a smelly vaginal discharge. Lochia or uterine discharge may be passed for several days. As long as the discharge does not smell bad, the discharge is considered normal.

Ringwomb – failure of the cervix to dilate. This condition occurs more in first time lambers but is certainly seen in older animals. The cause of this condition is unknown but a genetic component is suspected and some have suspected chlamydia infection. Others feel that it may be related to improper hormone signals due to placental abnormalities. No specific treatments exist. The ewe presents as straining but no fetal parts appear. The water bag may or may not be passed. The ewe appears to be in labor but the cervix fails to dilate. Some veterinarians have tried hormonal therapy but results are not consistent and have not been rewarding. Manual dilation of the cervix may work but the cervix may tear. If one attempts to dilate the cervix, the cervix must be massaged and dilated slowly, 20 – 45 minutes. C-section is often indicated especially if the placenta is visible. Many times the lambs are dead in spite of surgery.

Pregnancy Toxemia – is a condition that occurs usually in ewes that are either over or under conditioned that are carrying twins or triplets. The major sign of pregnancy toxemia is the ewe is off feed and depressed. Eventually the ewe may stagger or go down and drift off into a coma. This condition occurs because the ewe is deficient in glucose as all of the glucose she produces is taken up by the fetuses. Medical treatment consists off administration of intravenous glucose and oral administration of propylene glycol, vitamin B complex and

increase the energy of the diet by feeding grain. A c-section or induction of parturition is indicated if the ewe does not respond to medical treatment. Prevention of this condition can be accomplished by feeding 1 1/2 – 2 lbs of grain during the last 6 weeks of gestation.

Prolapsed vagina There are several causes as to why a ewe may prolapse her vagina.

- Causes – poor quality feeds, have increased rumen fill to meet energy demands and the vagina is pushed out due to intraabdominal pressure. Phytoestrogenic forages such as legumes may cause laxity of the vaginal supportive structures resulting in prolapse. Body condition score less than 2 and above 3.5. Overcrowding at the feed bunk which causes increased abdominal pressure. Previous history of vaginal prolapse or previous trauma during parturition.

- Treatment – replace the vagina after cleaning with a mild soap. An epidural is helpful in replacing and keeping the vagina in place. Administration of a drug such as Banamine® for pain and inflammation is helpful. Antibiotics may be indicated depending on the integrity of the cervix and vaginal wall. After replacing the vagina one can place a purse string suture around the vulva. The suture should be placed under the skin out where the woolless and wool areas meet. Another means to keep the vagina “in” is to use a “ewe saver”. The “Ewe saver” is a plastic spoon shape blade that is placed in the vagina and the ends of the retainer are tied to tags of wool. The ewe can lamb over the retainer.

Prolapse Truss. Using a harness method, a piece of twine or small rope is doubled over. The midpoint of the rope is placed on top of the neck's base. The ends of the rope are crossed over and passed between the two front limbs. The ends are brought up under the elbows, over the ribs and then crossed over the back of the ewe. The ends are then passed between the udder and the hindlimbs and carried back up and crossed over in the area of the vulva. The two ends of the rope are then tied to the rope where it crosses the back. The pressure that the rope applies to the back and the area of the vulva will prevent the ewe from straining, keeping the vagina in place.

I feel it is very important to break the cycle of straining with epidurals or pain medications. Some ewes will continue to strain resulting in death of the lambs and absorption of toxins. These ewes need a c-section and the prognosis is guarded to poor.

Milk fever or hypocalcemia – hypocalcemia usually seen in ewes 2 to 3 weeks prior to lambing. Ewes will stagger or be unable to rise. In severe cases, the ewe may be comatose, Ewes with hypocalcemia may experience a prolonged 1st stage of labor. Treatment consists of giving calcium borogluconate 60 – 100 ml SQ. Can give intravenously but it should be administered very slowly with extreme caution.

Uterine prolapse – may occur at the time of lambing or several days after parturition. The uterus is cleaned off and the ewe/doe's hindquarters are raised and the uterus replaced. Pouring 5 gals of water into the replaced uterus will help ensure the tips of the horns are unfolded. Antibiotics should be given as well as 20 IU of oxytocin; that is only 1 cc. Oxytocin is a powerful drug and a ewe never needs more than 1 cc at a time. Purse string suture around the vulva is optional. Check tetanus status and booster if necessary.