

"FACT SHEETS"

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Western Region USDA-SARE

SHEEP SHEETS INDEX*

SHEEPDEX

PAPER COLOR/

B = behavior

GREY 20#

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* RECYCLED PAPER @ \$.002/SHEET

NOTE: Printed under the Navajo Sheep Project (NSP) registered trademark and logo, because the NSP was established in 1977, well known and recognized on the Navajo Nation and the United States, whereas the USDA-SARE project was only guaranteed funding for two (2) years, but a third year helped provide needed work. The NSP will continue the publication, printing and distribution of the "Sheep Sheets" beyond the life of the SARE grant which ended February 28, 1997.



SHEEP SHEET

by Dr. Lyle G. McNeal, Executive Director, Sheep & Wool Specialist
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Dystocia, or difficult birth, is common in sheep and causes the death of many lambs and ewes. Yearling ewes and lambs are much more susceptible to lambing problems than mature ewes that have lamb previously. Obesity and lack of exercise during late pregnancy contribute to the incidence and severity of dystocia in sheep.

Ability to recognize lambing difficulty is an important as technique in relieving dystocia. A common error of the inexperienced shepherd is to intervene too early in the lambing process. A vaginal examination of lambing ewes should not be performed unless necessary because it increases the risk of infection of the female reproductive tract after lambing. A good rule of thumb is not to intervene as long as a ewe is making progress. When a ewe has been in full labor for 30 to 40 minutes with no progress, examine it to determine if the lamb is positioned correctly. Never try to force the cervix open because it often leads to hemorrhage, shock, trauma, and post-lambing infection.

There are a few hard and fast rules about handling dystocia. Gradually developing expertise through experience is often the best way to learn. Beyond simple assistance, the novice should call a veterinarian (if nearby) when in doubt about proper procedures. Many lambs and ewes die because of prolonged manipulation of lambs in the birth canal and excessive forced extraction of the lamb(s). Never try to extract forcibly a lamb that is in an abnormal position. The position of the lamb must be corrected before attempting actual deliver. Excessive force can result in shock, hemorrhage, trauma, and post-lambing infection, fertility problems, and very possibly an eversion or prolapse of the vagina and uterus.

Dystocia (Lambing Difficulty)

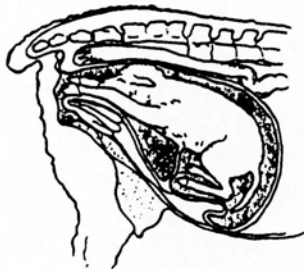
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If an examination is deemed necessary, clip excess and dirty wool from around the anus and vulva and then scrub this area thoroughly with soap (preferable a disinfectant soap) and water. Re-scrub whenever the ewe contaminates the area with feces (manure) during delivery. Under some conditions antiseptic procedures are almost impossible. However, try to be as clean as possible. Carefully scrub your hand and arm with soap and water and apply a mild antiseptic. It is also recommended that during the lambing season shepherds should keep their fingernails trimmed very short, in order to prevent tearing the soft tissue of the ewe's reproductive tract when assistance is rendered. Many, but not all shepherds use a disposable plastic or rubber veterinary obstetrical glove/sleeve. Next apply liberal amounts of a lubricant jelly to either the sleeve or bare hands and arms. **This is most important and do not forget this requirement!** It is almost impossible to use too much lubricant. Ewes that have been in labor for a long period often have a dry birth canal or vaginal area. Failure to properly lubricate the birth canal usually results in trauma and tearing of the soft tissues, a very difficult birth, and the prospects of infection after delivery. It is often recommended to put mineral oil, lubricant jelly or soapy water in the birth canal and even in the uterus before handling the unborn lamb.

The **normal presentation** or position of a lamb during birth is head first with the head between the forelegs. With multiple births, it is common to have the legs of one lamb and the head of another entering the opening of the birth canal at the same time. If forelegs and the head are present in the birth canal, gently pull on the legs to make sure that they are from the same lamb as the head. If the legs and head do not belong to the same lamb, take plenty of time to repel (push back) the head if necessary and follow the legs up to the body. If the problem is simultaneous delivery of twins, repel one back into the uterus while holding the other. This is

accomplished by putting a lamb saver or lamb snare over the head of the lamb nearest the birth canal and holding it toward the rear of the ewe while repelling the other lamb. Do this carefully and gently, using lots of lubricant.

Normal Presentation



Anterior presentation (head first) with the lamb's head turned backward is another common cause of dystocia. Repel the lamb, place a snare over the head, bring the forelegs into the birth canal, and begin steady traction on the lamb after thoroughly lubricating the birth canal. Use good judgement and common sense on the amount of traction (pressure) applied to the lamb. Once the head and forelegs are through the birth canal, apply traction as much in a downward as an outward direction because the birth canal is arc (curved) shaped. Pulling straight back forces the lamb into the top of the birth canal. Take advantage of the physical principle of using the pelvis as a fulcrum and it makes assisting a difficult birth much easier on the shepherd and especially the ewe and the lamb.

Anterior Presentation



Lambs can be born quite easily in the posterior presentation where the rear of the lamb is presented toward the birth canal. Bring both rear legs into the birth canal, lubricate, and pull steadily. A **breech presentation** is the rear of the lamb presented to the birth canal with both rear legs forward. Repel the lamb forward, grasp one rear leg, and bring it into the birth canal. Follow with the other leg. Use extreme care because the toes of the rear leg can easily penetrate (puncture or tear) the wall of the uterus during this procedure. When in doubt, call an experienced shepherd or a veterinarian.

One of the most serious problems and,

unfortunately, fairly common problems is a ewe that has been in labor for a long time with a dead, swollen, retained lamb, and possibly mummified. The birth canal is dry, swollen, and the ewe may be quite sick. Seek professional attention because the life of the ewe is at risk. After delivery of the dead (necrotic) lamb, treat the ewe rigorously for infection and toxemia.

Breech Presentation



Occasionally, delivery through the birth canal is impossible, usually because of an excessively large lamb. A Caesarian section can be quickly and easily performed in such situations. A veterinarian or experienced shepherd should make this decision. The prognosis for both the ewe and lamb(s) is much better by avoiding prolonged attempts at delivery through the birth canal. When in doubt, get professional help.

Other Lambing Problems

Several other problems can occur at or near lambing time. Vaginal prolapse prior to lambing is common and may occur in large numbers in a flock. If this is a problem, a veterinarian, sheep expert, or extension agent should evaluate diets, housing (if any), exercise, and general management.

Failure of the cervix to dilate (opening between uterus and vagina, which lamb must pass), especially in ewe lambs, is a problem in some flocks. Its cause is not fully known. Selenium deficiency is known to be one contributing factor to this problem, but there are many others. Seek professional assistance if unsure.

Use drugs and hormones, such as oxytocin, only under the guidance of a veterinarian, and when needed. Purchase of such prescription drugs without the order of a veterinarian is a violation of the Federal Food, Drug, and Cosmetic Act. Under a veterinarian-client-patient relationship, such drugs may be very valuable in the handling of obstetrical and lactation problems of ewes, but misuse is dangerous.

For more information write The Navajo Sheep Project, Inc. PO Box 4454, Logan, UT 84323-4454. The Navajo Sheep Project is a registered non-profit Utah corporation.



SHEEP SHEET

by Dr. Lyle G. McNeal, Executive Director, Sheep & Wool Specialist
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Coyotes, feral dogs, domestic dogs, and other types of predators have been a problem for sheep producers throughout the United States, but generally the Western region gets hit hardest.

Predators of sheep in the United States

Rank

1st	Coyotes @ 63%
2nd	Dogs @ 16%
3rd	Mountain Lion @ 5%
4th	Eagles @ 4%
5th	Bears @ 2±%
6th	Foxes @ 2±%
7th	Bobcats @ 2±%
8th	Wild Pigs @ 1±%
9th	Gray Wolf @ NA

Several methods have been utilized by producers, and federal and state agencies. Both lethal and non-lethal tools have been used. Today environmental concerns and attitudes about predator control can be found at all levels in society. Depending on the magnitude of predator problems in your area, access to support resources for control may be limited. In recent years, flock guarding dogs have been utilized. This technique was adapted in large part from the practices used by Navajo shepherds in the 1970's. Yet, not all flock guard dogs have been successful. Dogs require feeding, and food that is different from what grazing sheep and goats consume.

In recent years a viable alternative method of protecting the flock from unsolicited predators has been found to be effective, although most reports are mostly anecdotal, unique success stories have been reported.

Flock guarding llamas

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Coyote predation on sheep and goats

Coyotes do kill sheep and goats. Predation is the leading cause of sheep deaths and represents a serious problem for the sheep and goat industry. U.S. losses of sheep and goats due to predation have approached \$100 million. Lambs and kids are most vulnerable. Coyotes are now found in every state, and even the large cities.

The sheep and wool industry already operate on a low profit margin and losses due to predation have resulted not only in reduced income for the producer, but also in increasing prices paid by the consumer for lamb meat and wool products. Predation is a serious problem with a significant impact on the U.S. and the Navajo sheep and wool industries. It is a critical issue with both economic, environmental, and ethical implications to wildlife management, the livestock industry, and the non-agricultural community.

Reducing coyote predation

Since the introduction of domestic sheep to the North America in the 1500's, many methods for reducing predation of sheep have been tried. Generally speaking, methods can be divided into:

- Preventative methods, and
- Control.

Preventative methods are implemented prior to predation problems and are generally non-lethal to the predators. These include the use of:

- Fencing,
- Guard animals, (dogs, burros, etc.)
- Frightening devices,
- Taste aversion, and
- Sheep husbandry methods, such as night corralling and shed lambing.

Control methods usually are put into place after damage has occurred and are targeted at specific animals, usually being lethal to the

predator. These methods include:

- Shooting,
- Poisons (toxicants),
- Trapping,
- Toxic collars,
- Snaring, and
- Fumigants.

Local and state regulations regarding these regulations vary.

The best flock protection is provided by an integrated management program that includes both preventative and selected control methods. No single method is 100 percent effective by itself. An integrated approach is the most ecologically and economically sound, yielding the best long-term protection.

Guard animals

A guard animal is any animal that, when placed with a flock, represents a threat to predators. The 'ideal' guard animal should protect sheep against predation, while requiring minimal training, care, and maintenance. It should stay with and not disrupt or harm the flock, and be cost effective. A variety of guard animals currently in use includes dogs, donkeys (burros), llamas and alpacas. Of these, guard dogs are by far the most common.

During the past 15 years with the birth and growth of the llama industry in North America, llamas (and alpacas) were occasionally pastured with sheep. To the surprise of owners, they observed fewer sheep were being lost to coyotes and dogs. Sheep producers began experimenting with llamas as guard animals. Today, their use in North America is on the increase.

What is a llama?

Llamas are members of the South American camel family, where four camelids are found:

1. Domesticated llama
2. Domesticated alpaca
3. Wild guanaco, and the
4. Wild vicuna.

Surprisingly, llamas and their camel relatives were originally native to the grasslands and deserts of North America, but suddenly disappeared from here 10,000 to 15,000 years ago, about the time of the last glacial advance.

Today, llamas are used in the Andean Mountains as beasts of burden for carrying produce and

trade goods. Alpacas come in a variety of natural colors, and their fine wool is made into soft sweaters and blankets. Guanacos have brown bodies and blackish faces and are found primarily on the Patagonia of Southern Argentina, while the smaller vicuna dwells in the high altiplano grasslands of the Central Andes.

Because domesticated llamas originated from guanacos, the two have much in common. Llamas, guanacos, alpacas, and their hybrids are used as guard animals for sheep, but all are referred to in a generic sense as guard llamas.

Present use of guard llamas

Guard llamas are run with sheep, from the stubble wheat fields of the central plains, to the mountain meadows and open rangelands of the west. Guard llamas are found throughout the U.S., with most in the Intermountain/Rocky Mountain region (Montana, Wyoming, Colorado and Utah) and the far west (California and Oregon).

The vast majority of guard llamas in use today are gelded males. Intact males are a potential hazard to the ewes. Therefore it is not recommended that intact males be utilized. One guard llama may be kept with as few as four sheep or as many as 2,000 head. Llamas over 18 years of age are still in service guarding. It has been reported that a well managed guard llama could live as long as 25+ years. Whereas, it has been found that guard dogs have a 2-3 year survival expectancy on western range sheep operations.

Introducing llamas to sheep

Generally speaking llamas of any age can be introduced to sheep, but it appears that somewhere about 2 years of age is more common.

The number of sheep in which to introduce the llamas is not critical. When first introduced, the llama usually is curious or neutral toward its new companions, while the sheep are either neutral or afraid. The initial adjustment period lasted only a few hours for most llamas, with others within a week. Many producers have also found guard llamas demonstrating a keen interest and bonding to young lambs.

How and why do llamas protect sheep?

The highly social South American camelids are aggressive towards members of the canid family (coyotes, foxes, dogs, etc.). Apparently over time canids have been important predators on the camelids, so that today, llamas are naturally suspicious of any members of the dog family. Guanacos and vicunas in South America have been observed aggressively chasing Andean and Patagonia foxes, but fleeing from mountain lions. Adult male guanacos are very territorial, protecting their turf and sounding alarms to their family unit when predators are spotted.

Once a guard llama becomes familiar with an area and is attached to the sheep, the pasture, paddock, range unit becomes the llama's territory and the flock becomes the llama's family unit. Even the gelded llama, these innate behaviors remain. Generally, guard llamas are not passive bystanders, but are active leaders and protectors of their flocks. During daily movements of a flock or band, llamas may take the lead position to 'break trail' for the sheep, walk and graze in their midst, or trail at their heels.

A producer should not worry if the guard llama separates from the flock to stand or rest nearby, and especially on a ridge or hilltop overlooking the sheep. The llama in this position, having advantage with an intrinsic long neck and in that position may also be surveying the area for some particular security concerns. It could be that a predatory intruder may be near.

If the sheep flock has a herding dog that typically chases, barks, and acts hostile towards the sheep during herding, the guard llama at first can be aggressive towards the dog. If there is a family dog on the property that does not chase or bother the sheep, the llama usually will habituate to the dog and not attack it. However, some family dogs have been attacked and injured by guard llamas.

It does make a difference whether one or two guard llamas are used. Two or more work in some cases, but overall it has been reported that predation in flocks using more than one llama is higher than for flocks using only one.

Although llamas are introduced to sheep in a variety of ways, it makes little difference in the llama's total effectiveness in protecting the

sheep. Sheep first introduced to guard llamas on open range tend to have higher predator losses than those introduced and bonded into a confined corral type system. Although lambs become bonded to llamas and can be found interacting playfully with llamas, llamas introduced to ewes and lambs are no more effective than those introduced to weaned or dry ewes (without lambs).

As far as the most suitable age to introduce a llama to a flock, it has been stated that llamas do not reach their full protective potential until 1-2 years old.

Care and management of llamas

Llamas are easy keepers. Guard llamas and sheep can be cared for without any major differences and no special feeds. A 250 lb. gelded llama typically consumes 7 to 10 lbs. of good grass hay per day. Access to free-choice trace mineral granular texture and fresh water are important. Grain feeding is not necessary. Llamas typically don't bloat, even with a sudden change of pasture or hay.

Sickness in a llama can be best detected by making daily visual checks for subtle changes in behavior. If a llama is sick and won't get up, colic or heat stress could be suspected. Depending on the region, and tested fecal examination, llamas may need to be dewormed 1-4 times per year. Annual vaccinations for Clostridial diseases, including tetanus, are recommended. For detailed information guard llama users should contact a llama association for information, and consult a local veterinarian for specific health concerns.

Cautions!

Some potential problems to be aware of when running guard llamas are aggressiveness and breeding (of sheep). Some producers have lost sheep due to the breeding behavior. If an intact, sexually mature male is used, he should be closely watched during the breeding season. Castration can modify behavior, but necessarily in all cases. It has been reported that a one injection treatment of 200 mg of *Depo/Provera (medroxyprogesterone)*, a human birth control product, most effective in eliminating the male and/or gelded llama desire to breed.

A few producers have also found their guard llamas to be overprotective, so much that the

producer had difficulty working with the sheep. The best thing to do with a llama that is overprotective would be to separate the llama from the flock, in a catch pen while performing normal sheep management operations.

If the shepherd finds that the sheep are preventing or keeping the llama away from his feed, it is best to arrange a feeder that is out of reach by the sheep, but accessible by the llama.

Not a cure-all

Flock guarding llamas offer a viable non-lethal alternative to the problem of predation on sheep. Regardless of the approach when dealing with predators, particularly the adaptive coyote, no method at this time could be stated to be 100% effective. However, realistically it is felt that without doubt, the use of llamas to guard flocks generally is a recent methodology found to "reduce coyote predation."

More questions

Guard llamas may also serve to protect other animal species. A few ranchers and farmers have used guard llamas to protect ducks, geese, goats, deer, and even cattle. These reports certainly bring out more questions about the llama and his socially adaptive and protective influence with other animal species.

For more information locally about llamas, contact one of the following organizations:

International Llama Association (ILA)
P.O. Box 370505
Denver, CO 80237
(303) 756-9004

Rocky Mountain Llama and Alpaca Association
(RMLA)
593 19-3/4 Road
Grand Junction, CO 81503
(303) 241-7921

Llama Association of North American (LANA)
P.O. Box 1882
Minden, NV 89423
(702) 265-3177

Adapted from: Franklin, W.L. & K.J. Powell, 1994 Guard Llamas - a part of integrated sheep production. Iowa State Univ. Extension Pub., Ames, IA



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SHEEP SHEET

by *Dr. Lyle G. McNeal, Executive Director,
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During 1996 many of the Central and Southwestern States faced serious drought consequences. Most of the media exposure and sound bites dealt with Texas, Oklahoma, and Eastern New Mexico, but little was mentioned about the Southwestern region, such as Arizona, Western New Mexico, SW Colorado, and Southern Utah. These areas, the land, the forage, the livestock and the producers also suffered great losses in livestock, income, and most experienced higher costs to retain smaller herds and/or flocks. Many, particularly the cow-calf producers under the umbrella of another year of poor cattle prices, liquidated their herds rather than risk facing high wintering costs and a repeated losses.

Unfortunately, drought is one of those 'acts of Nature' or 'of God' that knowledge and predictability are at best a good guess! Even with modern satellite technology, and all of the highly trained meteorologists on the 6 o'clock news, cannot with certainty state when the next drought will begin, where it will begin, the severity, and how long it will persist. Although, statistically, most areas highly prone to drought situations have some predictability of frequency and cycle, but again, this is not perfect knowledge, but partial knowledge based on risk. Having live my entire life in the West, I have had the opportunity often enough to experience droughts, and learn to make, albeit unwanted, but necessary alternative management decisions about livestock and forage utilization. Sometimes, mistakes have been made, but none costly enough to warrant entire liquidation of a herd or flock. "Knock on wood!"

Definition: What is drought? The economic definition of a drought is the "cumulative effects of below-normal rainfall (snow/precipitation)",

Dealing with drought!

August 1966

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causing a reduction in production and/or an increase in costs resulting in lower net income. Another definition states that drought is a sharp decrease in rainfall in a given year. Or it may be defined as a sharp or prolonged decrease in range feed conditions.

Whatever definition is used, a drought is when soil moisture is deficient during a period of time, and enough to cause soil, plant, and animal damages and/or losses.

Consequently, livestock producers must face the following alternatives and choose those which can be adapted to their particular area, region, and situation(s):

Retain all stock and let them take their chances

To choose this alternative, producers would need reasonably good range and/or pasture feed reserves, sheep (or goats) in good condition and favorable prospects or moisture in that region for the next 3-4 months. Management decisions will need to be made in relation to this alternative. In order to reduce critical feed requirements lambs can be weaned at 6-8 weeks of age and put on the best feed, green feed, or confined (corralled) and fed oats and alfalfa chaff after having been taught to feed in the previous two weeks before weaning by feeding the ewes and lambs. The economics of this are questionable. Adult sheep can be fed a survival ration by controlled grazing and rationing it to animals without critical needs such as late pregnancy, lactation (nursing) or growth of young animals. Soil erosion must be watched with over-grazing!

Sale of wethers and cull ewes after shearing them

Sheep numbers can be reduced by selling good conditioned wethers and cull ewes after shearing them to get maximum income from wool and thus reduce carrying capacity as quickly as possible. The freight charges to market and the

market price of such animals needs to be taken into consideration.

Feed the nucleus (main flock) of breeding stock to be carried through the drought

When shepherds are in a critical situation then quite tough decisions have to be made. Cull heavily all but a nucleus of sound-mouthed, sound legged, high producing breeding stock. Unwanted animals should be disposed of as soon as possible. Confine nucleus flock to a small area using solid or rocky ground with good, or relatively close source to water, and some shade if possible, if feeding is to continue for many months. Gradually start feeding ewes and lambs on oats (or other low cost energy feedstuffs over 1 to 2 weeks. Lambs can be safely weaned at 6 to 8 weeks of age if they weigh at least 20 pounds or more and feed onto the best green feed or grain plus good quality alfalfa hay in a separate confined area. Younger or lighter lambs cannot be weaned with safety. They may have to be destroyed. Sort off poor doers and shy feeders and either feed these separately or dispose of them. If may be possible to fatten for sale shy feeders and the best of the surplus stock on the remainder of the farm before the end of spring, if considered economical, with the nucleus confined and the consequent reduced stocking rate. Feed ewes for survival in this confined corral with approximately 8 inches of trough-side per sheep.

It is essential to calculate feed reserves and the minimum expected before effective precipitation is likely to return. Sheep require the equivalent of one pound of oats per head per day, or 3/4 lb. of barley or wheat, or 1 1/2 - 2 lbs. of hay (depending upon quality), or 3-5 lbs. of silage. Obviously, depending upon availability and cost, other roughage and concentrates (grains) or by-products should be considered. The economics of buying feed to feed even the nucleus of breeding stock is seriously questionable during periods of extended drought conditions, and depressed market prices of sheep and lambs.

Adjustments and relocation

Every avenue for possible relocation of the flock should be investigated before disposal of livestock at give away prices or at worst the wholesale destruction of animals. Producers should investigate the possibility of moving and

relocating their flocks to other areas either in the region, the state or neighboring states for alternative grazing resources. Assistance for trucking to distant areas for relocation would be desirable in considering this alternative. For example, a few nucleus herds and flocks located in the southwest during this current drought have been able to move their animals further north in the Rockies and Midwestern states, where conditions have produced surpluses of feeds and forages in 1996. However, the overall costs and returns associated with this type of relocation should be evaluated before any decision is made.

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Planning for drought

Consideration of the occurrence of drought most likely is the major short- and long-term planning deficiency for most western livestock producers, because the bulk of feed consumed by range sheep and cattle consists of forages produced on either native or improved ranges. The quantity of the forage depends on many uncontrolled physiological conditions of which one of the most limiting in the arid and semi-arid West is moisture. The presence or absence of drought almost invariably determines whether a livestock producer has a good or poor income year.

Thus, drought management decisions are internalized informally in the mind of the livestock producers. Common sense dictates most of the day-to-day short run decisions, however, the long term decisions are rarely if ever considered by livestock producers, generally speaking.

Stockpiling feed for a drought may not be the most economic strategy, depending on the individual producer's ranch and feed situation. If possible having enough stored feed and grazing alternatives for one year is recommended. However, it would be far better to have two years stored, if feasible. Native hays tend to store better than legume hays (alfalfa, clover, pea, vetch and others) although both lose quality rapidly, unless hay preservatives have been added. After two years of storage, hays lose most of their important nutritional value.

A flexible flock (or herd) adjustment program could be developed based on the variability of moisture conditions. A system developed in the

Planning for drought

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Midwest is based on five (5) moisture conditions with adjustments made internally within each condition. See figure below.

A flexible flock or herd adjustment plan based on moisture levels

1. Moisture much below normal:

Action - Cull closely by selling all light weight lambs (60 lbs. or less) or calves (400 lbs. or less), use feed reserves, and then start liquidating breeding herd as necessary.

2. Moisture below normal:

Action - Replace cull ewes or cull cows with yearling ewes or heifers, use reserve feed, and sell lambs (80 lbs. or less) and calves (500 lbs. or less) at heavier weights than condition #1 above.

3. Moisture normal:

Action - Replace cull ewes or cull cows, sell half the lambs (80+ lbs.) or calves (500+ lbs.) at heavier weights than condition #2 above, and consider feeding the other half.

4. Moisture above normal:

Action - Replace cull ewes or cull cows, feed lambs (110+ lbs.) or calves (600+ lbs.) to heavier weights than condition #3 above, and build feed reserves.

5. Moisture exceptional:

Action - Replace cull ewes and rams or cull cows and bulls, buy additional livestock, build up financial and feed reserves, and feed all lambs (110+ lbs.) and calves (600+ lbs.) to heavier weights than condition #4 above.

Note: The above plan is only applicable to livestock producing areas that customarily have land with sufficient cropland to provide most if not all of their own feed reserves. The key with this suggested plan is "**flexibility**" within each particular livestock operation.

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The obvious choice of feed in a drought will be the stored hays and feed grains that is on the farm or ranch.

However, some feeds have special properties to meet the requirements of, say weaners and lactating ewes and may have to be saved or purchased and brought in if they are not on the farm. Alternatively, a producer's stored feed may be in demand in the area and he may profit by selling it and buying a cheaper substitute.

If feed has to be bought, there may be a number of alternative roughages from which to choose. During a drought, the major feed requirement of livestock is energy. Generally speaking cereal grains, i.e. corn, barley, oats, and wheat are examples of high energy feeds. But they are also more costly per unit of weight. On the other hand, legume roughages, i.e. alfalfa, clover, vetch, pea, and grass mixes with the above legume hay contain less energy than grains, but have higher protein values per unit of weight. Grass hays, i.e. oat, beardless barley, brome, fescue, bluegrass, Bermuda and other harvested grass forages contain less energy and protein than the grains and legume hays.

Generally, the roughage that provides the cheapest source of energy is the best to buy. However, certain classes of animals have special requirements.

Special needs of some classes of sheep

Weaned lambs and breeding ewes in late pregnancy or in lactation need roughage in their diet. Often this can come from pasture residues but very often some quality hay must be fed,

Selecting drought feeds for sheep

August 1996

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especially if the major part of their ration (diet) is wheat, barley or oats.

These classes of sheep may also need a higher protein content in their diet, which can be obtained from some supplements. For example, low-protein oats can be supplemented with peas or beans (pinto, lima, navy, etc.).

Pregnant ewes need a proportion of roughage during the last four to six weeks of pregnancy and the first six weeks of lactation. However, hay alone, unless of very high quality, is not a satisfactory diet for ewes in late pregnancy, as they find it difficult to eat enough to satisfy their needs. They will need about 11% to 12% crude protein in their rations.

Weaned lambs need some roughage in their ration at least until they are about 5 to 6 months old. Weaners also need good water. They need about 14% to 15% crude protein in their rations.

Ewes in early pregnancy and adult wethers have no special requirements to be concerned about, particularly during drought.

Characteristics of feeds

Hay

Because of its value to ewes and weaners and in introducing sheep to grain, good quality hay is an important resource during a drought. Stocks of hay should be carefully monitored and regulated during the drought feeding program. Hay is often difficult and expensive to buy during a drought.

The quality of hay depends on its composition and the time of cutting. The earlier the hay is cut and the higher its legume (alfalfa, clover etc.) content, the better it is. Save the best quality hay for the weaners and if the drought persists preserve it for the lactating ewes.

When buying hay, always buy by weight; do not buy on a per-bale basis (if possible) without checking the weights of the bales first. Bale weights can vary by as much as 100%.

Straw

Straw can be used as the roughage part of a ration during a drought but its protein content is low and so is its digestibility; it may need extra treatment before it is used as a livestock feed too. Ammoniated treated straw has shown benefits in reducing the costs of wintering ewes in early pregnancy. Short, fine stemmed straw is more acceptable than coarse clean straw. All of the cereal grains leave straw as a residue following grain harvesting (wheat, barley, oat, rye, etc.).

Oats

Oats is the safest cereal grain to feed because of its high fiber content, which helps to reduce digestive problems. Oats is usually in strong demand during a drought and the cost per energy unit will generally be higher than that of other grains, like wheat.

If there are limited quantities of oats on the ranch, they should be reserved for weaner lambs as part of their ration and other special purposes; for example, quickly introducing sheep to grain diets.

Oats is, however, lower in protein than most other grains (around 13% crude protein). In the absence of a green harvest, some protein supplementation will be needed if low-protein oats form the major part of the ration for weaners and ewes and lambs.

Wheat

Because its fiber content is very low, wheat should be introduced carefully to avoid digestive problems and even deaths. Experience in previous droughts has removed much of the prejudice against wheat and has shown it to be a valuable drought feed.

Wheat (like other grains) has a high energy content. It is likely to be one of the cheapest sources of energy and the most readily available during a prolonged drought.

The wastage of wheat and barley when fed on the ground seems to be less than the wastage of oats.

Barley

Barley contains more fiber than wheat, and has close to the same energy value. Experience has indicated that it may produce fewer digestive problems than wheat.

However, barley still needs to be fed with the same care as wheat when sheep are being introduced to it.

Sorghum and Corn

These grains, particularly sorghum has about the same energy value as most of the other grains. However, corn generally has one of the highest energy values of all the feed grains.

Peas and Beans

Peas and beans have close to the same energy value as wheat, but have much higher protein contents. These can be used to best advantage by adding small quantities (up to 20% or 30%) to enrich low-protein rations for weaners and lactating ewes.

Pellets, Cubes and Wafers

The value of these feeds as drought rations is largely determined by considering their energy content. Generally the more fiber they contain, the lower their energy content.

Pellets generally have a higher protein content than grains. In most cases, however, **there is no advantage** in paying a premium for pellets with a very high protein content as drought rations unless they are used, like peas or beans, to balance a protein-deficient ration.

Pellets should be introduced carefully to avoid digestive upsets. Pellets may vary in their composition, particularly as the drought progresses, and care should be taken feeding a new batch of pellets to sheep that have been eating pellets for some time.

Be sure to limit feed the pellets to the sheep, especially ewes or rams. The rate of passage for pellets is faster than most roughages, thus, consumption will increase significantly. Economics will obviously dictate a strict feeding regime, if producers must resort to pellet feeding.

Protein, minerals and other supplements

The protein content of a grain will vary with the region, state, locale etc. where it was grown and the season. As a very general rule, the plumper (fatter) the grain kernel, the better the energy value but the lower the protein content.

In most cases there is no advantage in paying high prices for extra protein in feeds for drought feeding. Similarly, supplementation of sheep with urea and vitamin A is not likely to be profitable even under drought conditions. Some examples of primary exceptions are as follows:

Grain that is too low in protein for milking ewes and weaners can be improved by adding a **protein supplement**, another grain more concentrated in protein like peas and beans.

Protein supplements such as peas and beans fed to ewes before breeding may improve twinning rates.

Lambs that are dry-lot fed for sale as fats need a high-protein diet, followed by energy as they near the mature frame and muscle mass.

Where roughage is of poor quality and is being fed as the only ration, or with grain to weaners, it can be improved by adding a **protein supplement** such as cottonseed oil meal, soybean oil meal, linseed oil meal, peas, beans, etc.

Dry sheep fed solely on very low quality roughage such as cereal straw may be helped by a urea-molasses liquid supplement or block, but the response can be variable and some sheep will not consume the supplement at all. More reliable results would come from a supplement of hay or grain.

Vitamin A can be beneficial to weaned lambs up to one year old if they have not eaten green feed for three to four months. Rams that have been fed grain with no green feed for six months may have improved fertility if fed vitamin a month before breeding.

Limestone and salt are valuable additives to grain rations, especially for ewes in late pregnancy and early lactation, if stock have been fed a heavy grain diet for a long period.

Summary

Selecting the 'ideal' drought feeding program may not be possible or feasible during such a serious environmental crisis, however, the primary nutrients a sheep producer must surely be concerned with for the ewes and lambs are energy and protein. Meeting the nutrient deficiencies during the drought is important, but the daily dry matter intake and bulk value of the feeds is paramount to overall flock health, next to a clean and reliable source of drinking water. Finally, the driving force that limits a producers response to dealing with drought conditions, is his access to the financial resources to procure the necessary feedstuffs. If economics is the limiting factor the only alternative when found in these situations may be partial or total flock liquidation. Unfortunately, market prices for livestock producers finding themselves in a drought, are most likely to be extremely depressed. Thus, the sheep producer may feel abandoned to the circumstances and either get out of sheep ranching permanently or possibly temporarily.

For more information write The Navajo Sheep Project, Inc. PO Box 4454, Logan, UT 84323-4454. The Navajo Sheep Project is a registered non-profit Utah corporation.



SHEEP SHEET

by **Dr. Lyle G. McNeal, Executive Director, Sheep & Wool Specialist**
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Basic ranch or farm water management should provide sufficient water for immediate stock needs with a safety margin to ensure adequate supplies during a drought or periods of reduced rain and/or snowfall.

The adequacy of livestock water supplies on a ranch will be determined by two main factors:

1. Quantity of water available - daily availability and annual storage capacity per head, and
2. Water quality - palatability and content of salts.

Water quantity

When planning water facilities and the quantity of water required by livestock these factors should be considered:

- Species of animal (sheep, cattle, horse, goat, etc).
- Age of animal - related to body size.
- Environmental conditions - temperature and humidity.
- Degree of activity - distances between feed and water.
- Type and amount of feed - green or dry.
- Physiological state of the animal - dry, pregnant or lactating.
- Health of animal.
- Water quality - the higher the salt content the lower the intake.



Livestock water supplies

August 1996

Sheepdex N-1

Normal water consumption by livestock*

Animal	gals/day	gals/year
Sheep	2	660
Beef Cattle	10	3516
Dairy Cattle	15	5494
Horses	10	3516
Pigs	5	1758
Poultry		
(per 100 birds)	7	Fowls 2527
		Turkey 4395

* Remember, these are average figures and individual intakes may be affected by the factors affecting water quantity consumption earlier.

When planning ranch or farm water schemes it is necessary to ensure sufficient capacity to meet peak daily requirements and peak seasonal needs.

Water quality

The quality of stock water is determined by the salinity or mineral content of the water. Stock water of high mineral content will cause stock to go off feed and lose body condition, and may lead to death. Reproduction and lactation processes may also be affected.

Stock tolerance to saline water depends on:

- Salt content - concentration of total salts and the type of salt.
- Climatic conditions - high temperatures increase water intake; they also increase evaporation and raise the salt content in troughs and storage facilities like tanks.
- Species of livestock.
- Acclimatization - access to water supply prior to increase in salinity level may encourage stock to drink water.
- Type of feed - important in poultry and pigs fed prepared rations containing high salt level. Also, green feed vs dry feed.
- Physiological state or level of production - pregnant and lactating stock are less tolerant than mature stock.

Water quality or salinity levels are usually expressed as "parts per million" (ppm) of total soluble salts (t.s.s.).

Guide to the use of saline water

Less than 1000 ppm - excellent quality water; ideal for all classes of livestock and poultry.

Up to 3000 ppm - satisfactory for livestock; upper levels may be too high for poultry on supplementary feeds with a high salt content (reduce salt content of feed).

Up to 5000 ppm - satisfactory for sheep, cattle and horses; unacceptable for poultry and pigs.

Up to 7000 ppm - will affect milk production in dairy cows; beef cattle will start to lose condition; upper limit for horses; may be unacceptable to young growing stock.

Up to 10,000 ppm - upper limit for beef cattle; unsuitable for young stock of all species; avoid use for pregnant and lactating stock.

Over 10,000 ppm - suitable for dry sheep (wethers); body condition will be maintained up to 13,000 ppm, depending on type of feed; avoid use for pregnant or lactating ewes.

Algae

Build-up of algae in tanks and dams can block intake pipes in mills and tanks. A rapid build-up of algae during warm conditions in summer and autumn may lead to stock losses from algae poisoning.

Algae can be controlled in dams and tanks by the use of 'blue stone' (copper sulphate). Copper sulphate will corrode metal tanks, troughs and pipes; careful dilution will reduce corrosion.

Most states have water testing services available. It is recommended that you contact your local Cooperative Extension Service County Agent for more local information.

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SHEEP SHEET

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Shepherd's have tended to occasionally neglect the shepherd's skills in recent years. A high number of lambing ewes per available shepherd can be responsible in some cases, a lack of incentives with others, while a general lack of skill may be the general reason.

However now, with the sheep numbers down significantly in the United States, and that continuing downward trend is also reflected on the Navajo Nation. Yet, when lamb market prices are as high as they have been over the last few years, it stands to reason that any shepherd, manager, or flock owner, should be investing more time redeveloping the skills required to be an all around shepherd.

Good shepherding could improve the lambing percentage by 5%, and up to 10% in flocks where losses are generally high.

There are four major aspects of the shepherds art:

1. Reviving chilled lambs,
2. Reviving starving lambs,
3. Remothering mismothered lambs and
4. Artificially rearing lambs.

Reviving chilled lambs

There are lambs which are well on the way to death when found. They are usually only a few hours old. They were probably born on a night that was cold and windy or wet and may or may not have had a suckle of colostrum milk (first milk). They are still breathing, and you can tell they are very cold by placing a finger in the lamb's mouth.

The basics of saving newborn lambs

August 1996

Sheepdex L-1

First, put the lamb in a warm place in a barn or shelter. If not, your vehicle, camp, house, or hogan will certainly work. If possible, catch the lamb's mother or identify her with a dye pistol (a squirt gun with human hair dye), chalk or paint mark for catching later. Identify the lamb with a spray paint, chalk, or crayon too, where you have several lambs to deal with.

One of the best ways of warming a lamb is to surround it with warm water bottles wrapped inside an old blanket, old burlap wool sacks, or similar materials. Infra-red heat lamps, blow dryers, partial submersion of lamb's body below the head and neck into a bucket of warm water, or just putting the lamb wrapped up in front of a wood fire or stove will also work. Usually when the lamb has revived it will become more active, show more alertness, make sounds, and soon will begin moving around and looking for suckling (or a feeding of milk).

Give a minimum of 120 ml (4 oz) of natural colostrum as soon as possible, preferably by suckling dam, but if that is not possible one of the many devices available on the market for feeding weak lambs. The weaker and lethargic the lamb, the more assistance the shepherd will have to provide. Stomach tubes and/or esophageal tubes are alright too. But care must be taken so as to prevent the tube from going down the trachea and potentially placing the milk in the lamb's lungs and possibly drowning it. The 120 ml is enough to provide the lamb with useful amounts of antibodies to various common diseases.

If you cannot obtain the stomach tube, use 24 inches (2 feet) of 1/8 inch inside diameter hold plastic tube, round the end in a flame and punch a few holes near the end with a leather punch.

Hold the lamb's head up so that its neck is straight, and gently push the lubricated tube down its esophagus (throat). Reminder - make sure the tube does not go into the lungs. Hold

up the reservoir funnel and fill it with colostrum. If using a plastic tube, a regular 60 ml plastic disposable syringe may be easier to feed the lamb with, since the funnel with a neck thin may be difficult to find.

When the lamb revives, get it sucking from its mother as soon as possible.

Reviving starving lambs

If the weather is mild, mismothered or abandoned lambs may wander around for 2-3 days gradually losing their internal fat reserves before they die. The skilled shepherd can identify these lambs by their hollow-sided, gaunt, tucked-up look. The earlier they can be picked out the better the chance of saving them.

Starving lambs may not necessarily need warming but will need colostrum immediately. In addition they should be given dextrose solution (or glucose), combined with amino acids and electrolytes would also be beneficial if available, as an instant energy supply.

Once revived these lambs will need a foster mother, or will need to be artificially reared.

Remothering lambs

Many ewes separated from their own lambs will take them back without trouble. Others, especially maiden ewes (yearlings or first time lambers), are often reluctant to take them back, and may need firm encouragement for 12-24 hours (or more) before they will. One reliable method is to tie the ewe to the side of a pen with twine so that the lamb can suckle without being kicked or butted. Other methods of grafting back a lamb to its birth dam are available, and all have varying degrees of success rates. A few of those methods will be mentioned in the next section. Make sure that the ewe has milk and that the lamb is getting a meal before you release the ewe and lamb.

Fostering or Grafting

There are two time-honored ways of getting a ewe to take another lamb. These are:

5. Skin the dead lamb of the ewe to become the foster mother, and fit the skin over the body of the lamb to be fostered; and
6. Rub the fetal/placental fluids of the dead lamb all over the lamb to be grafted, paying particular attention to the head and tail regions, where the ewe smells.

Another technique which works sometimes is to paint the head and tail regions of the lamb, and the nose of the foster ewe, with a strong smelling lingering compound like human aerosol spray deodorants, fly repellent aerosol for sheep wounds, and now available commercially manufactured lamb adopting aerosols. The stanchion grafting method, where the ewe is placed in a stanchion where she can still eat, drink, and lay down, but can't butt the grafted lamb away from suckling. Even rubbing fecal material and urine from the foster dam onto the foster lamb has worked. One that has proven very successful over time in the U.S. has been hand milking fresh milk from the ewe to receive the grafted lamb, and then smear her milk on the face, mouth, and tail area of the lamb. Lastly, another method that has worked, is just to tie one of your dogs that likes to bark and make noise right next to the ewe and lamb to be grafted. In many instances, the ewe's focus is changed to the obnoxious dog, thereby ignoring the lamb that you want to graft to her, and let basic natural survival skills take over where she will be forced to protect the lamb from the potential predator.....the barking dog!

Colostrum

Natural colostrum is preferable and it can be stored in a freezer for up to two years, in case of emergency. If there is no colostrum available, an artificial colostrum can be made. Colostrum is the lamb's "critical first meal!" Always do the best you can to see that each lamb receives colostrum from its birth ewe.

Colostrum has three important functions for the early newborn lambs, and they are as follows:

1. Its unique and valuable **nutritional** role for the lamb,
2. A source of **antibodies** for immunity and to fight early lambhood diseases,
3. Its **laxative** effects to 'jump start' intestinal motility and removal of meconium.

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SHEEP SHEET

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All sheep producers are faced at some stage with orphaned lambs or lambs with mothers unable to feed them because of mastitis or damaged teats (i.e. shearing cuts). Whether it is worthwhile trying to save these lambs will depend on how many there are, how much time can be spared and how much they will be worth once reared. If something is to be done, lambs can be reared by fostering or hand rearing.

One in 10 lambs in the United States die of starvation. Bonus lambs come from:

1. Quadruplets and triplets,
2. Weak twins,
3. Orphan or unclaimed lambs,
4. Dams with no milk,
5. Twin from a mother in her first lactation.

Fostering

Fostering is the easiest option in the long run if a suitable ewe is available. Various means can be tried to encourage the foster mother to accept the lamb. A traditional ploy is to attach the skin of the ewe's own dead lamb on the orphan until the ewe accepts it. Alternatively, the ewe's sense of smell can be overpowered or confused by smearing a strong smelling substance such as aniseed, various aerosol type products, or even the ewe's own milk on the lamb around his nose, face, and the tail and dock area. The same material should also be placed on the ewe's muzzle. A few special commercial products are also available for this purpose.

Confine the ewe and lamb in a restricted area with food and water until the relationship is firmly established. Hold the ewe several times a day to ensure that the lamb has a suckle, or tie her head up in such a way that she cannot butt or repel the lamb, but still reach her food and water.

Rearing orphaned lambs

August 1996

Sheepdex L-2

The critical first meal - colostrum

Every lamb needs a first suckle (drink) of colostrum, the thick milk available from the freshly lambed ewe. Colostrum is rich in energy and protein. It has a milk laxative effect to move the fetal feces (dung) and to prevent the formation of a hard rubbery blockage (clot-like) of milk in the stomach.

Colostrum also carries disease-fighting antibodies produced by the ewe. These antibodies give the lamb short-term protection against gut (intestinal) and bowel infections until it is able to build up its own resistance. If the ewe has been properly vaccinated, her antibodies will protect the lamb from clostridial diseases such as enterotoxemia (overeating), tetanus and others until it is vaccinated.

If a lamb is to be hand reared, or fostered on to a ewe that has previously suckled a lamb for more than two days, first give it at least one feeding of colostrum. The lamb may die after a few days with an intestinal blockage (partially digested milk clot) in its gut if this is not done.

If a freshly lambed ewe is available, the orphan lamb can be suckled on one side without affecting the survival of her own lamb. Better still, milk out one side by hand and give the orphan lamb 100-150 ml (3-4 oz) of colostrum, using a coarse (large) "eye dropper," a plastic pop bottle with attached teat, or teaspoon. Store the remainder in small, clean, sanitized containers in the freezer. Colostrum should keep for at least six months and up to two years or more without deteriorating, so that a "bank" of colostrum will last right through the lambing season.

Carefully thaw frozen colostrum in a lukewarm water bath no hotter than 104°F (40°C) so the vital antibodies are not destroyed. Do not thaw frozen colostrum in a microwave oven!

Cow's colostrum can be used if ewes' colostrum is not available. It can also be stored frozen until

needed. However, because antibodies are dam (mother) specific, do not expect the same level of disease protection, as is found with the birth mother.

Artificial colostrum

The following artificial mixture can be used as a substitute for the first day's feeding if natural colostrum is not available:

- One quart of fresh raw cows' milk,
- One beaten egg,
- Two teaspoons of glucose or lactose (if unavailable, use sugar)
- One teaspoon of cod liver oil (or castor) oil.

Condensed milk, appropriately diluted, can be used instead of fresh raw cows' milk.

Mix (shake) well, and divide the mixture into four equal feedings for the first day's feeding. Divide it into six equal feedings instead of four if the lamb is small or weak.

Artificial rearing

Choice of feed

Full cream cow's milk is the obvious choice for small numbers of lambs if it is available and is not normally sold.

Calf milk replacer can be used if full cream milk is not available.

Cow's milk is weaker than ewes' milk, and contains about 4% fat and 8% solids-not-fat, compared with 7% and 12% for ewes' milk. So, if using calf milk replacer for lambs, make it up at a more concentrated mix. Do not water-down cows' milk - if anything, strengthen it with milk replacer. However, do not overdo this as over strong milk can cause constipation and death.

Choose a high-fat calf milk replacer where possible; some are too low in fat for lambs.

A producer can also choose to simplify the matter by purchasing any of the commercially manufactured 'lamb milk replacers' available at livestock feed supply businesses. These commercial lamb milk replacers are scientifically formulated to meet most, if not all of the suckling lambs nutritive needs, except mother's companionship. They usually run 24% protein and 30% fat (homogenized).

How to feed

The standard plastic pop drinking bottle fitted with a artificial lamb teat can be used to hand feed each lamb four times a day if only a few lambs are to be reared. This works well but is very demanding and time consuming.

Use of self-feeding "lamb bars" if more than three or four lambs are to be reared may be made or purchased. Lamb bars can handle up to about 30 lambs and consists of a metal or PVC plastic tank with ewe size artificial teats attached. The "lamb bar" can be shortened or only one side used if only a few lambs are to be reared.

Each teat has a washer foot-valve inserted into its base to prevent leakage. This can be inserted quite easily by holding the teat open with the pliers normally used to expand lamb elastrator rings (used for docking and castration). Commercially, ready-made teats or nipples are also available for quick attachment to lamb bar milk holding tanks.

As an alternative, the teats can be set into the tank above milk level, with suction tubes instead of valves. This is quite satisfactory but the lambs may be a little harder to start.

Lamb bar buckets, both round and square buckets fitted with teats are available from sheep supply houses in the United States too.

All teats or nipples from artificial devices should be at least 14-15 inches above the ground level. It is best to group lambs by age and allow 2-3 lambs per nipple in groups of 10-20. Thirty lambs per grouping is alright as long as space permits.

When to feed and how much

Milk may either be fed warm and fresh, four times a day to begin with, or made available to the lamb at all times when convenient (*'ad lib'* feeding). Milk should be chilled (to prevent souring) before filling the "lamb bar" if it is to be available all the time. If the weather is warm it may help to insulate the tank.

Lambs soon get used to chilled milk and the best lamb growth rates (nearly 1 pound/day) have been achieved with this method. The lambs take a little milk every hour or so, as they would from

their mothers, and soon learn to regulate their intake.

All equipment must be thoroughly cleaned each day to prevent the spread of intestinal infections whichever method is adopted.

Start with four 4-6 oz feedings per day if the lambs are to be given several definite feedings each day (periodic feeding). Gradually build this up to four 16 oz feedings per day, depending on appetite. This should take about two weeks. Then go on to three 24 oz feedings per day before worming and weaning onto clean pasture or range.

Feed little and often where possible, because more lambs die from eating too much than from underfeeding. Overfeeding can also bring about serious scouring conditions with artificially reared lambs of any age.

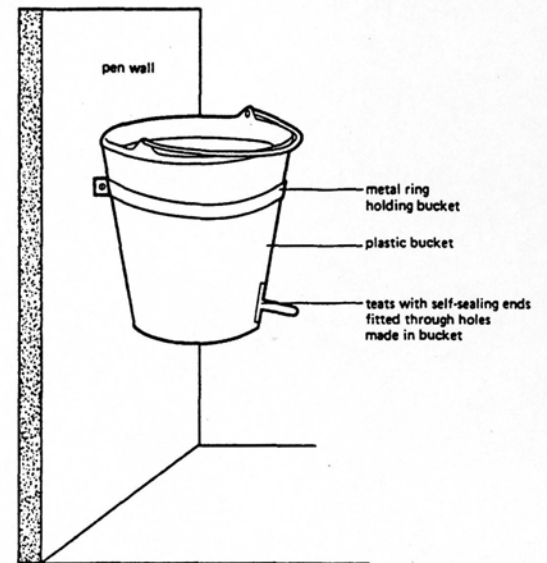
Weaning and general management

Four to eight weeks of milk feeding will be enough in most cases; well-grown lambs can be weaned after four or five. A producer may also use the figure of 25 lbs. in weight would be an adequate benchmark to wean artificially reared lambs. Weaning should be abruptly, and get the lambs on a dry starter, not straight onto lush pasture. Do not forget to dock, castrate (if buck lamb), vaccinate and drench artificially reared lambs at appropriate times.

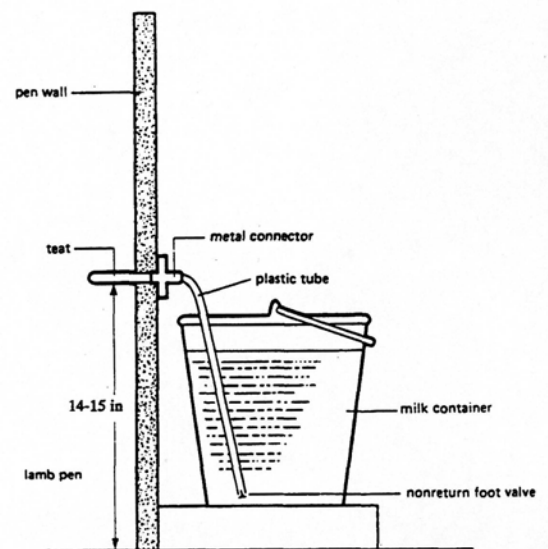
Lush pasture could be made available if possible. If not good quality hays (preferably legumes, i.e. alfalfa, clover, pea, peanut, or vetch) or silage may be used. Lambs being fed harvested roughage like hay or silage, should also have access to grain or grain mixes, which could include a calf starter. All lambs should have free-choice 24 hours per day good clean fresh water. A coarse ground trace mineral salt should also be accessible to the lambs at all times.

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Inexpensive bucket feeder for small groups of lambs.



Simple equipment for feeding groups of lambs.





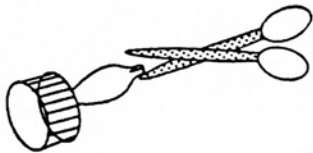
SHEEP SHEET

by Dr. Lyle G. McNeal, Executive Director, Sheep & Wool Specialist
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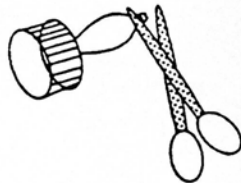
New teats (nipples) are supplied with no hole in the end and thus must be cut before use. There are two different techniques to cut the teat. The common, older technique is to use a sharp scissors and snip it off cross-ways. Thus, the more you snip off, the bigger the hole, so do not overdo it.

Another technique is to carefully slit the end into two (2) halves with scissors. The two halves snap back together when not in use thus "self-sealing" the end of the teat. Most important, this self sealing method of cutting the teat allows the bottle of milk to be left in an inverted position from which the lambs can suck at their leisure. Many shepherds today prefer the "Pritchard" teats over the larger old fashioned teat models still on the market. Others have found the same preference applies to goat kids.

New method



Old method



Using the "Pritchard" teats in feeding orphan lambs

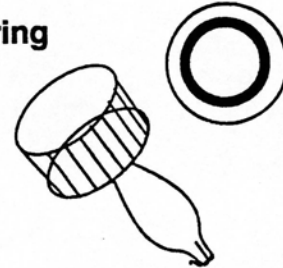
August 1996

Sheepdex L-3

Be sure not to lose the tiny ball that rattles when you shake the teat. If you do the teat will leak. This happens rarely, and primarily only from washing the teats too aggressively.

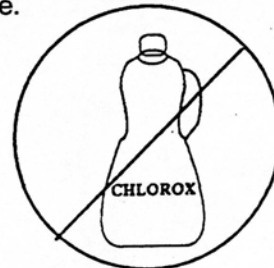
Don't leave teats sitting in the sunlight or overheated areas. Especially do not leave them sitting on a window ledge or the dashboard of a vehicle. Sunlight from this "greenhouse" situation has been known to heat up the latex until it melts into a gooey blob. As all areas of high heat are bad for this type of latex, it's best not to leave them close to an active wood stove or furnace.

Latex inner ring



Don't use them without the latex inner ring. This ring, included free only on "Pritchard" teats enables an easy seal to all bottles. If you use the teat without the latex ring, the teat will make a very poor seal on the new tamper proof bottle tops and will thus either leak or split the yellow portion of the teat.

Don't clean the teats in boiling water. Use warm water with a little dishwashing detergent and nothing more.



Don't use Chlorox to disinfect them. The strong chemical reacts with the latex and can cause rapid disintegration.

Don't use the teats beyond two years or three years. Latex tends to become sticky with use and prolonged exposure. We replace ours every year.

Bottles to use

Pop bottles of various sizes work fine. Now that the latex washer is included, the teats may be used with plastic bottles as well as glass. Glass bottles disinfect better, however.



For new-born lambs using a plastic maple syrup bottle (the kind with a handle) works well. The shape allows the shepherd to squeeze the bottle as needed. In doing so we can actually push the milk into the lamb's or kid's mouth. Because the bottle is clear you can easily see how much milk remains in the container.

To obtain "Pritchard" teats, we suggest you contact the following outlet:

Premeir Sheep Supplies, Co.
Box 89,
Washington, IA 52353
(319) 653-6631 or
(319) 653-6634

For more information write The Navajo Sheep Project, Inc. PO Box 4454, Logan, UT 84323-4454. The Navajo Sheep Project is a registered non-profit Utah corporation.



SHEEP SHEET

by Dr. Lyle G. McNeal, Executive Director, Sheep & Wool Specialist
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There are many reasons why we sometimes need to encourage a nursing ewe to either adopt an "extra" or replacement lamb. Because the ewe first identifies with her own lamb immediately after birth by its own unique odor, she is unlikely to accept a foster lamb unless it smells like her own offspring.

The traditional method to get a ewe to foster a lamb has been to skin her dead lamb and place the skin over the orphaned lambs body that you want to get fostered. However, some modern day shepherds do not like to use this method, or a shepherd may not have a dead lamb to use for the skin. Two products that have been introduced to the U.S. sheep market are as follows:

1. Fostercoat™ and
2. Lamb Woolover™

Fostercoat™

Fostercoat is a possible solution to this problem. It has a unique knitted 100% polyester pile construction capable of absorbing lamb odor when worn for a time by the natural offspring. The Fostercoat is subsequently transferred to the lamb to be fostered who then smells enough like the natural lamb to be accepted by the foster ewe.

Uses

- Substitution fostering
- Add-on fostering
- Assist in retaining body temperature (i.e. hypothermia)
- Weather protection

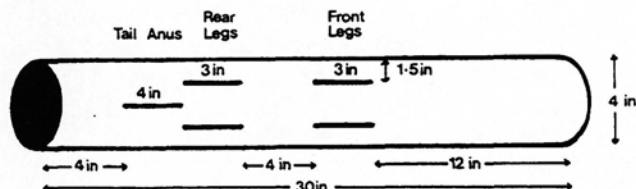
Lamb coats

August 1996

Sheepdex L-4

How to use Fostercoat™

Fostercoat may be cut to any length required. The diagram shows suggested measurements and position and length of slits for legs and anal-genital area. Openings for umbilical (navel) and the male genitals (sheath) are made after Fostercoat is fitted on the lamb.



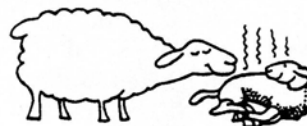
Substitution fostering

Substitution fostering is most successful when started as soon as possible after the birth of a stillborn (dead) lamb.

To substitute an orphaned lamb for stillborn lamb, pull the dead lamb through the Fostercoat several times. This process transfers the birth fluids from the dead lamb to the Fostercoat.



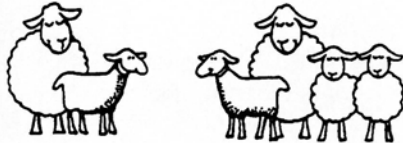
The lamb to be fostered is then fitted with the Fostercoat turned inside out and introduced to the foster ewe. It is advisable to tape or tie the lamb's legs for approximately 15 minutes to prevent it from sucking and to allow the ewe to become familiar with the foster lamb.



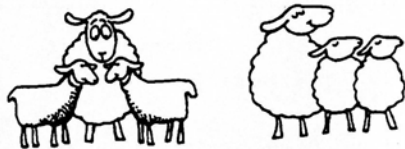
Fostercoats may be removed from adopted lambs 48 hours (2 days) after acceptance occurs.

Add-on Fostering

To add on an "extra lamb" to the ewe who has only a single lamb but enough milk to raise twins, Fostercoat is fitted on both the natural lamb and the lamb to be fostered.



After a few hours the lamb odors are absorbed by the Fostercoats. The Fostercoats are turned inside out and then exchanged between the two lambs and the lamb to be fostered is placed with the foster ewe and her natural lamb.



Since add-on fostering is more difficult than substitution fostering it is helpful to exchange Fostercoats several times to confuse the ewe as to which lamb is her own.

After use, Fostercoats should be discarded or washed prior to re-use.

Lamb Woolover™

The Lamb Woolover is a lamb coat that also provides multiple uses for the shepherd. The Woolover coat is made of 100% wool. However, the primary uses for it are as follows:

- Treating lambs for hypothermia and
- Grafting orphan lambs to a foster dam
- Protection from sudden weather changes

The Lamb Woolover is a durable product that can be re-used over and over again. It has no fasteners that could cause chafing to young lambs. No velcro or string ties are needed either. Fitting for a lamb only takes seconds. The same company that makes the Lamb Woolover makes them for goat kids and baby calves too.

Fitting procedure



1. Roll tail end of cover forward. Grasp both front legs in one hand and guide through front holes. Pull cover up to knees.
2. Push lamb's head forward through neck opening.
3. Unroll rear of cover and place each rear leg through holes. Covers will offer beneficial protection if left on the lamb until docking (2-3 weeks). The covers will then only be suitable for recycling.
4. To obtain multiple use of the covers they should be removed (weather permitting) after 3-4 days.

NOTE: If you are interested in obtaining either of these two commercially made coats, contact your nearest sheep equipment supplier.

Reference to or mention of a trade name, i.e. Fostercoat™ or Lamb Woolover™, or proprietary product(s) does not constitute a guarantee or warranty of the product by The Navajo Sheep Project and does not imply its approval to the exclusion of other products that may also be suitable.

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FLORA FACTS

Bill Varga
 Director Utah Botanical Garden
 & USU Extension Horticulturist

Some Reportedly* Medicinal Plants From The Intermountain West

Poultice

<u>Plantago major</u>	Plantain	Use whole plant.
<u>Mimulus guttatus</u>	Monkey Flower	Raw leaves and stems applied to burns.
<u>Penstemon brevisfolius</u>	Beard Tongue	Leaves dried, ground, then applied to running sores.
<u>Phlox longifolia</u>	Sweet William	Boiled leaves applied to boils.
<u>Argemone hispida</u>		Seed ground and applied to sores.
<u>Sambucus ssp.</u>	Elderberry	Roots boiled until soft, then applied to any inflammation.
<u>Sphaeralcea ssp.</u>	Globe Mallow	Roots cooked and applied as poultice.
<u>Geranium ssp.</u>	Geranium	Roots cooked and applied as poultice.

Toothache

<u>Achillea millefolium</u>	Western Yarrow	Bit of root inserted into cavity.
<u>Iris missourienses</u>	Flags	Bit of root inserted in cavity (will kill tooth!)
<u>Polygonum bistortoides</u>	Bistort	Bit of root inserted into cavity.

Earache

<u>Achillea millefolium</u>	Western Yarrow	Hot applications of leaves, flowers, and pounded root.
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Laxative

<u>Purshia tridentata</u>	Bitterbrush	Leaves raw or cooked.
<u>Artemisia ssp.</u>	Sagebrush	Leaves made into a tea.
<u>Rumex venosus</u>	Dock	Tea made from whole plant.
<u>Berberis repens</u>	Barberry	Root peeled, dried, and steeped for rectal hemorrhage and dysentery.
<u>Iris missouriensis</u>	Flags	Tea from root.
<u>Sambucus ssp.</u>	Elderberry	Tea from bark, berries, or leaves.

Diarrhea

<u>Eriogonum ssp.</u>	Buckwheat	Tea from cured roots.
<u>Erigeron ssp.</u>	Daisy	Tea from cured roots.
<u>Equisetum ssp.</u>	Horsetail	Extract from stems.

* The author neither intends nor implies a personal recommendation of the medicinal properties stated. Much information was taken from historical Native American writings.

Colds

<u>Abies lasiocarpa</u>	Subalpine Fir	Tea from needles.
<u>Eriogonum ssp.</u>	Buckwheat	Tea from roots.
<u>Cercocarpus ledifolius</u>	Mountain Mahogany	Scrapings from cambium.
<u>Rosa ssp.</u>		Tea from roots.

Eyes

<u>Linum lewisii</u>	Blue Flax	Steeped roots.
<u>Cercocarpus ledifolius</u>	Mountain Mahogany	Tea from dried bark for eyewash
<u>Purshia tridentata</u>	Bitterbrush	Tea from bark for clearing pus from eyes.
<u>Argemone ssp.</u>		Infusion from seeds as an eyewash.

Kidneys

<u>Juniperus ssp.</u>	Juniper	Raw or cooked berries.
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Heart and Tonic

<u>Cornus stolonifera</u>	Dogwood	Tea from inner bark has the properties of quinine.
<u>Apocynum androsaemilfolium</u>	Dogbane	Tea from roots (also highly toxic).

Stomach

<u>Linum lewisii</u>	Blue Flax	Stems steeped for stomach and gas.
<u>Artemisia tridentata</u>	Big Sage	Leaves chewed to aid digestion.
<u>Achillea millefolium</u>	Western Yarrow	Tea from root to relieve gas.
<u>Iris missouriensis</u>	Blue Flag	Tea from root to induce vomiting.

Diuretic

<u>Arctostaphylos ssp.</u>	Bearberry	Boiled bruised leaves for tea.
<u>Taraxacum officinale</u>		Coffee from roasted roots.

Depressant

<u>Arctostaphylos ssp.</u>	Bearberry	Boil bruised leaves for tea.
<u>Aconitum ssp.</u>		All parts (also very poisonous)

Stimulant

<u>Ephedra ssp.</u>	Mormon Tea	Tea from stems.
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Astringent (Skin Disorders)

<u>Betula ssp.</u>	Birch	Bark steeped.
<u>Equisetum ssp.</u>	Horsetail	Extract from stems

Sleeping Aid

<u>Achillea millefolium</u>	Western Yarrow	Tea from flower tops and leaves.
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Vitamin Supplement

<u>Stellaria ssp.</u>		Tea from dried plant for potash salts and vitamin C.
<u>Rosa ssp.</u>	Rose	Tea from rose hips for vitamin C.
<u>Fragaria ssp.</u>	Strawberry	Berries for vitamin C.
<u>Nasturtium officinale</u>	Watercress	Leaves eaten for vitamin C.
<u>Montia ssp.</u>	Miner's Lettuce	Greens to avoid scurvy.

* The author neither intends nor implies a personal recommendation of the medicinal properties stated. Much information was taken from historical Native American writings.

Asthma/Bronchitis/Hayfever

Datura ssp.

Leaves smoked or brewed as tea (also highly toxic)

Asclepias ssp.

Tea from various plant parts.

Ephedra ssp.

Mormon Tea

Tea from stems.

Helianthus annuus

Soak leaves and flowers in alcohol for "spoonful" medicine.

"Aspirin"

Populus ssp.

Tea from inner bark.

Salix ssp.

Willow

Tea from inner bark.

* The author neither intends nor implies a personal recommendation of the medicinal properties stated. Much information was taken from historical Native American writings.



FLORA FACTS

Bill Varga
Director Utah Botanical Garden
& USU Extension Horticulturist

Recognizing Dye Plants In The Wilds

Both native and introduced species of plants which have dye properties are numerous in the Intermountain region. Much of our basic knowledge on the extraction of dye from certain Intermountain plants actually developed from Native American culture. However, much has been lost because early ethnobotanists either did not ask or were not answered by a particular people at some places in time. Yet, much may be discovered by reading manuscripts in national archives.

Current written information can still be matched to the plant in the wild or in cultivation. To many spinners and weavers with an interest in natural-vegetable dyes there is a rewarding challenge in discovering the match-up between what is written and what is to be found in the wild.

The following pages contain a list of selected dye plants found in the Intermountain region. The list is organized alphabetically by the color of the dye which may be extracted from the plants listed. Page numbers which appear in the list refer to a page number in Ethnobotany of the Navajo.

Selected Dye Plants of the Intermountain Region

BLACK:

Pinon Pine Pinus edulis (*page 21) process

BLUE: "Any blue flower may produce blue dye" (Navajo Native Dyes)

Delphinium Delphinium scaposum (page 48) hearsay, petals

Alfalfa Medicago sativa (page 57)

Sumac Rhus trilobata (page 61)

BROWNISH:

Alder Alnus incana (page 39) process

Mountain Alder Alnus tenuifolia (page 39) process

Mountain Mahogany Cercocarpus ledifolius (page 39) process

Black Walnut Juglans major (page 39)

Juniper Juniperus monosperma (page 19) bark & berries dye wool green.

Lichen Parmelia molliuscula

* Indicates page number in Ethnobotany of the Navajo

CARDINAL:

Cactus Opuntia rhodantha (page 65) process
Spruce Picia pungens (page 21) root (page 65) process

GOLDEN BROWN:

Black Walnut Juglans major (page 39)

GREEN OR GREENISH:

Allium Allium ssp.
Rubber Rabbitbrush Chrysothamnus nauseosus graveolens
Iris Iris ssp.
Juniper Juniperus monosperma
Alfalfa Medicago sativa
Prunus Prunus ssp.

OLIVE-GREEN

Rubber Rabbitbrush Chrysothamnus nauseosus graveolens
Alum Root Heuchera parvifolia (page 52)
Cactus Opuntia rhodantha

PURPLISH:

Prunus Prunus ssp. (page 54) - (page 52) roots - wool

RED OR REDDISH:

Alder Alnus incana (page 39) process
Mountain Alder Alnus tenuifolia (page 39) process
Hackberry Celtis reticulata (page 41) process
Mountain Mahogany Cercocarpus montanus (page 39) process
Mormon Tea Ephedra ssp. (page 24)
Sunflower Helianthus annuus (page 87) outer seed coating boiled
Juniper Juniperus monosperma
Lichen Parmelia molliuscula (page 16-17)
Prunus Prunus americana (page 54)
Prunus Prunus ssp. (page 54)
Pear Pyrus malus (page 55) reddish-yellow? bark of apple

REDDISH-BROWN:

Rumex hymenosepalus (page 43) process

TAN:

Alder Alnus incana (page 39) process
Mountain Alder Alnus tenuifolia (page 39) process
Mountain Mahogany Cercocarpus montanus (page 39) process
Cliff Rose Cowania stansburiana (page 53) with juniper
Juniper Juniperus utahensis (page 16-17)
Juniper Juniperus monosperma
Juniper Juniperus occidentalis
Lichen Parmelia molliuscula (page 16-17)

YELLOW AND ORANGE:

Artemesia Artemesia ssp.

Rubber Rabbitbrush Chrysothamnus naueosus graveolens (page 84) process
Rabbitbrush Chrysothamnus ssp.

Rabbitbrush Chrysothamnus viscidiflorus (page 84) light orange?

Dahlia Dahlia ssp. (page 85) yellow-orange (cultivated)

Sunrose Helenium hoopesii (page 87)

Hymenoxys metcalfei (page 88) flowers color wood yellow

Lichen Parmelia molliuscula (page 16-17)

Marigold Tagetes micrantha (page 89) wool yellow

Thelesperma subnudum (page 89) wool orange

YELLOW-BROWN

Stansbury Cliff Rose Cowania mexicana

Juniper Juniperus ssp.

Dye Accessories

MORDANTS:

Lichen Parmelia molliuscula

Spruce Picea pungens

Sumac Rhus trilobata

Yucca Yucca ssp.

Page 85 - Yucca ssp.

Dried and crushed roots are placed in a sack and stirred in lukewarm water until rich suds are obtained, then the bag is removed and the wool washed in several baths of the suds.

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August 1996

Saving Money on Livestock Feed

Terrell R. Thayne, Graduate Research Assistant; Stephen E. Poe, Associate Professor; Ag. Systems Tech. & Ed. Dept.; Lyle G. McNeal, Professor, Animal, Dairy, and Vet. Sciences Dept.; Utah State University

Tips for buying feed:

◆ **Plan ahead**

1) Record how many animals you feed during a "normal" year.

2) Record how much you fed the animals (either how much you fed each day or the total amount of feed you fed for the year).

3) You may want to record the amount of time you have to feed your livestock during one year. This will also help you decide how much feed you will need for another year. The amount of feed needed will differ from year to year as a result of changing weather conditions such as drought!

◆ **Shop around**

1) Knowing how much you can expect to use will allow you to "shop around" to find the amount and quality of feed you want for a reasonable price.

2) Buy directly from the feed growers. The grower can sell feed to you for less than you can get it for through a "middleman".

◆ **Buy feed in larger amounts**

1) Feed producers are willing to sell their product for less when it is purchased in larger amounts.

2) Many livestock producers do not need large amounts of feed. It would be to your advantage to get your friends, neighbors, and family members

to buy feed together. Buying in bulk can result in a reduced cost for each person involved. When larger amounts are bought the feed producer will often deliver the feed at little or no extra cost to the buyer.

◆ **A storage facility** is needed if you are going to purchase feed in larger amounts for later use.

1) A relatively inexpensive storage facility is a simple mesh wire fenced hay stackyard. In the case of other types of feeds such as pellets or grain it will be necessary to use barrels or some type of building to protect the feed from moisture, rodents, and animals.

◆ **Being prepared** by knowing approximately how much feed you will need and purchasing the feed during the harvest season will save you money and you will not have to worry about where the feed you need for your animals will be coming from.

◆ There will always be rough times like droughts that will force livestock producers to buy extraordinary amounts of feed just to keep their animals alive. There will also be less difficult times when only a little extra feed will be needed to carry the animals through until they can be turned out to graze again.

Other years livestock producers

may find themselves with left over feed. This feed can be used later, but will lose some of the nutritional quality that it once had.

◆ These difficult situations just mentioned always catch people by surprise, and cause them to have to buy extra livestock feed for higher prices than they would normally pay.

Remember:

- ◆ **Plan ahead**
- ◆ **Shop around**
- ◆ **Buy in quantity**
- ◆ **Use safe storage**
- ◆ **Be prepared**

To plan for six months use one of the following:

1) To determine the number of **bales** of hay needed per **week**.

Number of animals _____ X _____ number of bales fed/week X 24 weeks
= _____ bales needed for six months.

_____ bales X _____ cost/bale = \$ _____ the amount of money needed to buy feed for six months.

2) To determine the number of **tons** needed per **month**.

Number of animals _____ X _____ number of tons fed/month X 6 months
= _____ Tons needed for six months.

_____ tons X _____ cost/ton = \$ _____ the amount of money needed to buy feed for six months.

Comparison of Bulk versus Small lot (5-10 bale) feed purchases.

	Weight (lbs.)/bale	Cost (\$)/bale	Cost (\$)/ton
Bulk feed purchase	120	6.00 - 7.50	105.00 - 130.00
Small lot feed purchase	120	10.00 - up	170.00 - up

'SHEEP IS LIFE' - *a celebration of Navajo-Churro shepherds and weavers*

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June 19-22, 1997 - Farmington, NM

PLANNED EVENTS & ACTIVITIES:

NOTABLE SPEAKERS ● HANDS-ON WORKSHOPS ● SEMINARS ● CLASSES ● TRADE SHOW ● SHEEP & WOOL TOURS ● REGIONAL TOURS ● RUG SALE ● TRADITIONAL WEAVERS (Navajo, Hispanic & Anglo) ● SHEEP & GOAT HUSBANDRY ● WOOL, MOHAIR & CASHMERE USE ● HISTORY ● GUARD LLAMA WORKSHOPS ● VALUE-ADDED ● MARKETING OPPORTUNITIES ● GRAZING LAND USE ● COOPERATIVES ● ENTREPRENEURSHIP SKILLS ● TEXTILE COLLECTORS ● MUSEUMS ● TRADITIONAL SHEEP CAMP ● & OTHERS

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