Montana Farm Flock Sheep Production Handbook

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I. Introduction

Montana is one of the leading sheep producing states in the US. Much of Montana is well suited to sheep production. Sheep can be used to harvest Montana's largest renewable resource--forage. They convert grass, a large variety of weeds, some browse and crop residue into food and fiber. Also, sheep grazing may be a cost affective and viable alternative to chemical control of noxious weeds.

The range sheep industry has declined significantly over the last decade. However, the number of small flocks that are used to supplement other farm income has grown in recent years. A small flock of sheep offers an opportunity for added income by utilizing land, buildings, labor and skills that otherwise would produce little. The initial investment and annual operation costs of a sheep enterprise are relatively low. Sheep production requires adequate but not elaborate facilities and equipment. Sheep utilize roughage as their primary feed supply and usually do not require large amounts of purchased feed. Labor requirements are relatively seasonal. Shearing and lambing can be scheduled to coincide with available labor. In most instances, virtually all the resources necessary for a small flock of sheep already exist on Montana farms and ranches.

In addition, the sheep industry continues to attract many newcomers. Sheep are a popular enterprise for small landowners. Before getting into the sheep business, a prospective producer should realize that sheep production must be regarded as a business. First, an assessment of one's available resources (labor, feed, facilities and investment capital) should be made. Then a realistic plan for the sheep enterprise can be developed. For instance, the time of year when labor

is available should determine when to lamb. People who have off-farm jobs often choose to lamb late (early summer) when the climate is more moderate and there is less demand for time during lambing. On the other hand, farmers and ranchers may choose to lamb early (during late winter) before spring crop work begins.

Any prospective producer who is not committed to giving sheep the management and care needed should reconsider prior to getting into the business. A genuine interest and a suitable environment are the major requirements for successful sheep production. Productivity of a sheep enterprise is highly variable and is largely dependent on the resources committed to that enterprise. When developing a sheep enterprise it is essential the program and production levels are designed with available resources in mind.

Another important factor that newcomers to the sheep industry must realize is that sheep are defenseless against dogs and coyotes. Owners must be aware of the potential problem these predators can cause. In areas where these problems exist precautions which minimize the conflicts (guard dogs, electric fenced, penning sheep at night, etc.) should be employed.

The purpose of this publication is to provide some of the basic information needed to be successful in the sheep industry. It does not go into detail on the phases of management, breeding, nutrition and marketing. This information combined with practical experience will assist in making a sheep enterprise profitable.

Goals

Profit should be the goal of all sheep owners. The following production goals or key indicators should be within the reach of most sheep producers:

- 95% conception rate in a 45 day breeding period for mature ewes (# ewes lambing divided by #
  ewes turned to ram times 100)

- 150% lamb crop (190% in Finn cross ewes) born on mature ewes of ewes lambing (# of lambs
  born divided by # of ewes lambing times 100)

- Less than 10% lamb mortality from birth to 30 days of age

- Less than 5% lamb mortality from 30 days of age to weaning

Popular Breeds of Sheep In Montana

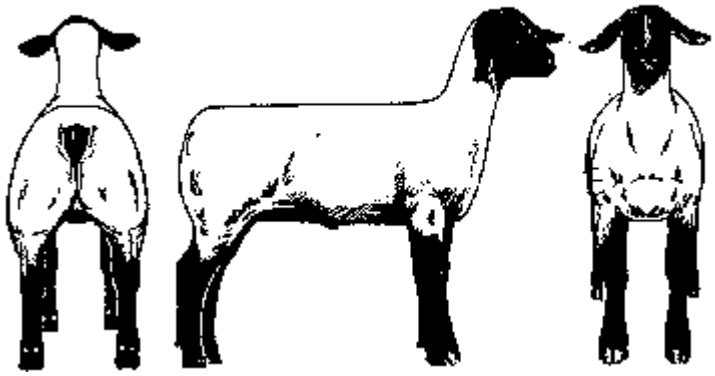
There are more than 20 breeds of sheep in the U.S. that contribute to commercial sheep production. Their use is influenced primarily by environmental adaptability, management goals and personal preference of the sheep raiser.

Some of the more prevalent breeds in Montana are the Rambouillet, Targhee, Columbia, Hampshire, Suffolk, Finn and Polypay. The Rambouillet, Targhee and Columbia are white-face breeds and are selected for both lamb and wool production.

Targhee

Columbia

The Hampshire and Suffolk are black-face, meat-type breeds and are selected basically for lamb production, growth rate, feed efficiency and carcass quality. Hampshire or Suffolk rams often are used to cross on white-face ewes for the production of market lambs. Because the lambs are crossbred (black-face X white-face), they all are usually marketed and replacement ewes obtained elsewhere.



The Finn is a breed selected basically for lambing rate and is used in crossbreeding programs to improve lamb production. It generally is not recommended that the ewes contain less than one-half Finn breeding. Ewes with one-quarter Finn blood have the potential to produce 200 percent lamb crops, which probably is all the lambs that a producer wants or can economically handle. The Polypay was developed at the USDA Sheep Station at Dubois,

Idaho, and is one-quarter Finn, one-quarter Rambouillet, one-quarter Targhee and one-quarter Dorset. It has the lamb production potential similar to other crosses with one-fourth Finn breeding. A rule of thumb is that for each 1% of Finn breeding, a producer can expect an increase in lambing rate of 1%. Another advantage of utilizing a small percentage of Finn breeding in the ewe flock is that a higher percentage of those ewes will breed and lamb at 1 year of age. However, remember as lamb crop increases, management level and nutritional inputs must increase.

Getting Started in the Sheep Business: Selection of Ewes

The success in a sheep enterprise quite often is determined by the type of sheep that a producer starts with. Before buying, learn as much as you can about the sheep you are interested in. Ask the seller to put the sheep into pens so that each animal may be thoroughly examined. Open their mouths and look at their teeth to determine the age of the sheep. The udder, or bag, should be soft, pliable and free of any knots or lumps. All sheep should have two functional teats. It has been said many times that unless you really know what you are buying, you may find that you are buying someone else=s culls and troubles. If you feel that you do not have the expertise to do an adequate job, take an experienced sheep person with you when you select breeding stock. Do not be afraid to ask questions. Beware of buying other people's problems.

Ideally, a beginning sheep raiser should start with 30 to 50 head of 3- to 4-year-old ewes. This number allows the investment in good rams and will require little more time and facilities than would be required for 10 to 20 ewes. The 3- to 4-year-old ewes have had enough experience to serve as teachers.

This, however, is often not possible. In many instances, the type of ewe that a beginning producer uses to start his sheep flock depends more upon what is available than what is preferred. Therefore, consideration should be given to the following when purchasing various age ewes:

Ewe lambs — Can often be purchased for much less than yearling ewes, and in some cases, may be a viable option. Their wool and possibly a lamb crop in many cases will pay for their years keep and provide a set of yearling ewes a year later that cost appreciably less than if yearling ewes had been purchased initially. Remember, however, if you are going to breed lambs, they should weigh about 95 pounds at the beginning of the breeding season. Also, it should be noted that ewe lambs have substantially lower fertility rates than older ewes. With Finn-cross ewe lambs, one might expect to get 80 to 90 percent bred as lambs. White-face (Columbia, Targhee and Rambouillet) ewe lambs usually do not mature sexually as early. One would expect only to be able to get 30 to 60 percent to lamb at 12 to 14 months of age.

Range-type, white-faced yearling ewes — Are usually available and can provide excellent foundation stock for beginning sheep producers. However, it must be remembered that yearling ewes are just beginners at motherhood. They require

	more attention in their first lambing season, just as a ewe lamb will, to avoid disowning and mothering problems.
Two- to five year old ewes	Are generally recommended to the newcomer, because they have enough experience to act as teachers and still have a productive life of several years. Good ewes of this age, however, usually are available only when a flock is being liquidated. Find out the reason for selling. There may be a health problem that would make their purchase unwise.
Five- and six year old ewes	Are often culled from range flocks because they would have a difficult time going through another lambing under adverse range conditions. But, with good feed and care they can get along fine and be quite productive for another year or two. Range ewes of this age, with good mouths and udders, usually will lamb at a satisfactory rate without difficulty and will be good mothers. However, a ewe's true age is a big concern when purchasing this type of ewe. Unless the ewes have been identified so that their age is known, there is no way to tell whether they are 5, 6 or 9 years old. Also, these ewes must be culled regularly on the basis of their productivity and apparent ability to lamb another year. The most common mistake is attempting to keep such ewes too many years.
Single- or one-term ewes	Are likely to be quite old and represent considerable risk. A higher percentage may die, not lamb or present problems at lambing time. Ewes of this kind normally are fairly cheap--but for a good reason. An inexperienced person would be well advised to avoid this kind of ewe, although an experienced sheep person might get along very well with them.

Under farm flock conditions, ewes normally are productive until about 7 years old. Few remain productive after 8 years. Obviously, then, a young ewe in good condition will produce more lamb crops and be worth more than an older ewe.

II. Sheep Selection

Although the correct feeding of the ewe is probably the most important key to profitability, the genetic makeup of the ewe must also be suited to the demands made upon her. Before deciding upon a genetic program, a producer's production situation relative to climate conditions, feed resources, facilities, available labor, market options and management level should be defined. Production objectives relative to the desired growth and reproductive rates, balance between lamb and wool production etc. must be determined. Traits that most affect income such as lambing rate, weaning weight, fleece weight and grade are often overlooked since they are difficult to measure. It’s a lot simpler to just pick the biggest and the prettiest ones. Visual appraisal of prospective breeding animals is a multi-billion dollar beauty contest. Sizing up sheep, as well

as cattle and swine, does not have the aura of beauty pageants or major sporting events, but it is probably the largest "contest" going on in the US.
In any sheep operation the genetic selection of individual animals and breeds and how we develop mating systems will determine the potential level of lamb and wool production. This sets the parameters of the production that are possible. The management provided determines the degree to which that potential is realized.

Selection goals vary among breeds and individual producers. The producer should decide which traits are economically important to him and place emphasis on them in a selection program. Heritabilities and relationships of individual traits should also be considered when selecting replacements. Examples of traits which are usually considered when selecting sheep include:

Reproductive Rate (15% heritable)	Although the heritability for multiple birth is low, progress through selection can be made. Twin and triplet replacements, or a replacement from a dam with a high reproductive rate, should be identified and preference given to them at selection time.
Weaning Weight (10% heritable if weight is taken at about 60 days of age and 30% heritable if weight is taken at over 100 days of age)	A lamb's weaning weight is a good indicator of a ewe's milk producing ability, as well as an early indication of growth potential. Weaning weights taken at about 60 days of age are highly influenced by the dam's milk producing ability. Use of these weights (60 day weaning weights) in selecting replacements is usually not recommended as they have not yet had a chance to express their true growth potential. By 100 days of age, much of the dam's effect is removed and thus these weights favor lambs that have the ability to grow on their own. When weaning weights are used as a selection criteria, the weights should be corrected for age, sex, type of birth and rearing and age of dam.
Post-Weaning Growth Rate (30% heritable)	Although weaning weights can be used to estimate an animal's growth potential, a more accurate evaluation of a individual's growth potential can be made from a post-weaning growth trial. Post-weaning rate of gain reflects directly on the lamb's actual growth potential.

Wool Production (40% heritable)	Individual producers should determine the economic importance of wool in their sheep operation and apply selection pressure accordingly. Pounds of wool, staple length and fiber diameter are wool traits commonly included in selection programs.
Inherited Defects	Defects such as jaw abnormalities, cryptorchidism and inverted eyelids should always be avoided.

Once the traits which are to be used in the selection program are determined, the producer must then evaluate the genetic potential of possible replacement ewes and rams for these traits. The desired genetic potential of sheep can be evaluated by different procedures. They include (arranged in order of increasing intensity and accuracy): pedigree, visual appraisal including show ring winnings, performance testing or measurement or the individual's own performance or measurement of progeny performance (NSIP). The selection of ewes can often best be accomplished using some form of mass or simplified selection system. On the other hand, selection of rams should involve as accurate evaluation process as possible. Very few commercial cattle enterprises do not use performance data (EPD's) to select herd sires. However, this is not the case in the sheep industry.

Management for genetic improvement requires a mix of art and science and may involve a varying degree of chance. By properly planning and developing goals for a selection program and then utilizing the most accurate tools economically appropriate to evaluate the genetic worth of replacement animals, the role that chance plays in the genetic progress of a sheep enterprise can be minimized.

Production Records

Keeping a good set of records on ewes and rams in the breeding flock and watching for weakness within the flock can help in assuring steady positive progress within your flock. These records can be extremely useful in identifying the most productive ewes within the flock and thus replacement stock which may have superior genetics. There are many different production record-keeping systems used by individual sheep producers. In many instances they are tailor made to fit individual needs. Production records such as the one shown in figure 4 are relatively simple and easy to keep. However, the basic principle still applies--some kind of record keeping pays off. Once a producer decides which traits are important, they must then figure out how to identify those sheep that are superior. Remember, what a person sees is not usually what they are getting. Less than half of what can be seen visually is due to genetic differences. The rest (over half) is due to what geneticists refer to as environmental differences -- did one eat more feed, is the bigger lamb a single, etc. The only portion of a sheep's superiority that can be passed on to its offspring is the portion that is due to genetic differences. In many cases those differences are masked by the environmental differences. Knowing this, we must conclude that we are probably

not doing a very good job of picking those sheep that might change things such as lambing rate, weaning weight, etc., by visual appraisal. The only trait easily changed by visual appraisal is mature body size. The only consolation is that until recently there was not a better way.
Quicker genetic progress could be made by standardizing environmental conditions as much as possible and objectively measuring differences in production -- hence the development of On-farm and Central performance testing. Although performance testing does not eliminate environmental influences, they are controlled to some degree. This changes our ability to identify those animals, and in particular rams, that are superior. Although we have greatly reduced the differences due to environment, chance still plays a significant role in our selection program.

As a result of rapid progress in genetic research and advances in computer technology, tools have become available to access the differences in animals due to genetic differences. When this knowledge is properly applied, rapid changes in levels of performance can be achieved. Through the National Sheep Improvement Program (NSIP), developed by the American Sheep Industry, expected progeny differences (EPD's) are made available to cooperating breeders. Through the use of the performance records of genetically related animals, an animal's own performance and a big computer the actual genetic producing ability of an animal can be separated from that component which is due to environment. They are developed from a complex set of calculations which combine potentially large amounts of information on individuals and close relatives. While it is not important we know how EPD's are calculated, it is important that we understand that EPD's provide an accurate comparison of animals genetic ability.

An expected progeny difference (EPD) is a prediction of the difference between the future progeny of an individual and the performance of a theoretical reference animal with a zero EPD. EPD values are expressed as plus or minus deviations from a zero base point in units applicable for each trait. EPD's below zero usually reflect low relative merit for a particular trait. However, for fleece grade a negative EPD is usually desired since that animal would be smaller or finer.

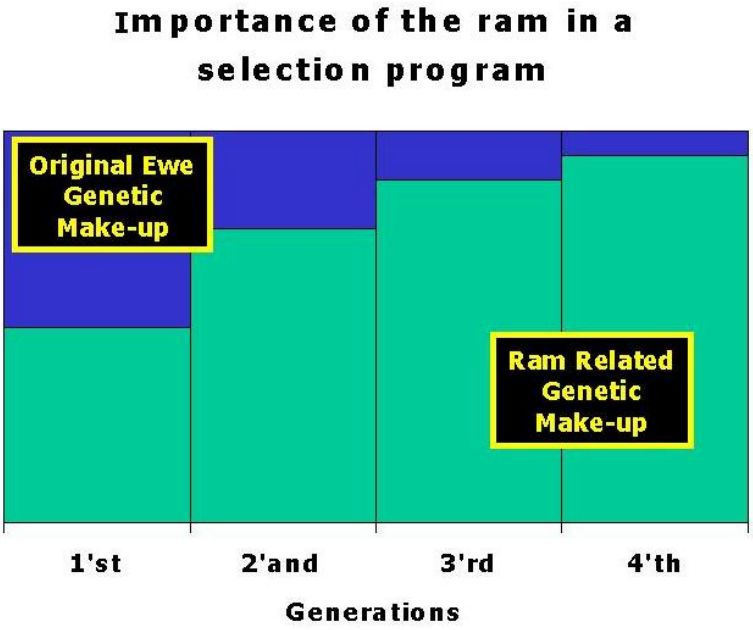
EPD			
A prediction of the performance of future progeny of an individual. It is a measure of only the genetic differences between animals.			
TRAIT	**EPD**		**COMMENTS**
	Sheep A	Sheep B	
Type of Birth	+.10 lambs	-.10 lambs	Daughters from Sheep A will have an 11% [(+.1) - (-.01) = +.11] higher lamb crop than those from Sheep B.
Weaning Weight	+3.12 lbs.	-1.02 lbs.	Daughters from Sheep A will have an average weaning of 4.14 more pounds than those from Sheep B.
Fleece Weight	+.04 lbs.	+.14 lbs.	Daughters of Sheep A will shear .10 lbs. of wool per shearing less than those from Sheep B
Fleece Grade	-.20 microns	+.10 microns	Daughters from Sheep A will be .30 microns finer than those from Sheep B.

Ram Selection

The ram's contribution to the profitability of a sheep operation is frequently neglected. The greatest impact of selection on sheep performance can be made through ram selection. Small producers who feel that their sheep flock is not large enough to justify purchasing a quality ram should consider renting one, or purchasing one in partnership with another producer before using a poor quality ram. Remember, it does not take too many pounds of lamb and/or wool to justify using a good quality ram, as opposed to an average one.

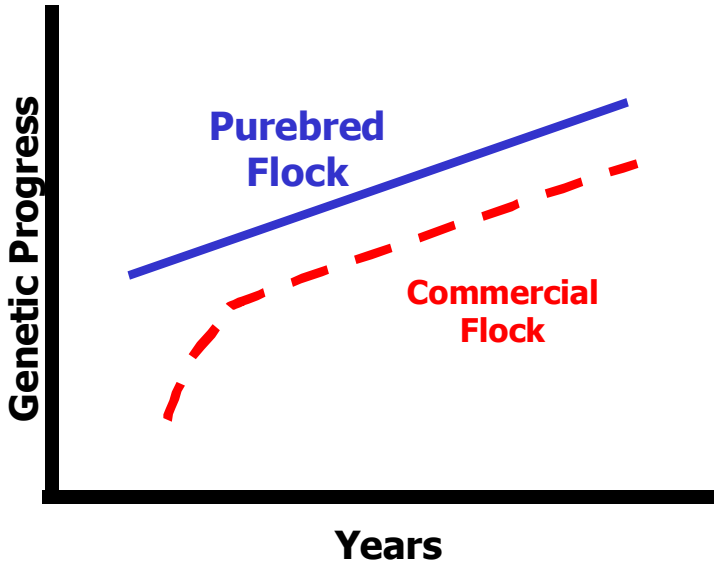
Careful selection of rams can benefit the producer in two ways. It contributes to the production efficiency of every lamb and to the genetic improvement of economically important traits in the herd. In Montana most commercial sheep flocks produce their own replacements but purchase their rams from purebred or seedstock producers. Since relatively large numbers of ewe lambs are needed for replacements and often detailed production and genetic records are not available (increasing the role chance plays in the selection process) genetic

progress through ewe selection is limited. In most sheep flocks 80 to 90 percent of the genetic progress comes from ram selection and only 10 to 20 percent comes from the selection of ewes.



The amount of genetic improvement made in commercial sheep flocks is primarily dependent on the genetic progress being made by the purebred or seedstock flock from which the rams are being purchased. As a rule of thumb the genetic merit of a commercial sheep flock increases at the same rate, only about two generations (6 to 8 years) behind, as the flock from which rams are being purchased. In short, whatever genetic progress or lack of progress that is being made by the purebred or seedstock producer is transferred to the commercial producer through purchased rams. What happens if the selection goals of the purebred producer and the commercial producer differ? For example, if the purebred producer's selection is based only on show-ring type traits, commercial producers purchasing rams from that producer are making progress in those same show-ring traits that the purebred producer is. However, little or no progress is made in the traits that are economically important (reproductive rate, total pounds of lamb weaned, etc.) to the commercial producer.

The profit or loss of a sheep enterprise often is determined by the type of rams that are used. It is always difficult to determine how much money one can justify paying for a ram. However, a good ram is worth at least four times the value of a good market lamb. Selection of a ram is a major decision, not something to be done on the spur of the moment. Nearly always the best ram will prove to be by far the cheapest. Likewise, a poor ram will certainly be expensive.



Expected change in a commercial sheep flock when rams are purchased from a purebred flock in which genetic improvement is being made.

III. Crossbreeding

A good breeding program will result in a flock of sheep that has a high reproductive rate, good lamb survival and good lamb growth rates. The genetic potential of a sheep flock can be increased through selection and crossbreeding. Progress in selection for economic traits is slow and requires patience and time compared to the improvement that can be realized by crossbreeding. Different breeds of sheep are superior in different traits. Not all economically important traits can be found in one breed. Crossbreeding can be used to incorporate the strengths of different breeds into a sheep producers program. In addition to the improvement that can be realized through the use of complementary breeds, are the advantages obtained from heterosis or hybrid vigor. In general, crossbreeds tend to be more vigorous, more fertile and grow faster than the average of the purebreds included in the cross.

Crossbreeding has been used to improve the genetic producing ability of the ewe flock by combining breeds that complement each other. The Finn sheep has been successfully utilized to increase the reproductive rate in our domestic breeds of sheep. As a general rule of thumb each 1 percent of Finn breeding that a ewe has will result in a 1 percent higher lamb crop than the base breed. In

addition, Finn X ewes have a greater chance to breed as a lamb and lamb at one year of age. Smut-faced ewes (Blackface X Whiteface) ewes are sometimes used in farmflock situations as they are more vigorous, live longer, more fertile and have lambs that are more vigorous and have higher livibilities. The major drawback to crossbred ewes is a significantly lower valued wool clip produced. Using crossbreeding in a terminal crossing program is common among sheep producers. The most common terminal crossing program involves crossing blackface rams with whiteface ewes. By doing this we can maintain a whiteface ewe flock that in well-adapted to the local environment, modest is size (to control maintenance costs -- big sheep eat more) and produces a high quality wool crop while taking advantage of the larger faster growing ram breeds. Most research data shows that crossing blackface rams with whiteface ewes will result in a 15 to 20 percent increase in lamb production through a combination of increased lamb crop born, increased lamb survivability and increased lamb growth rate.

In a terminal crossbreeding program all lambs from the cross are marketed. A very important part of designing such a system involves consideration of how to obtain or produce replacement stock. Probably the simplest is to buy replacement stock, provided high quality replacements are available at a reasonable price. If replacement ewes are going to be raised, about 20 to 40 percent of the ewes would need to be mated to whitefaced rams to produce suitable numbers of replacement ewes from within the flock.

IV. Reproduction

Reproductive rate or the number of lambs marketed per ewe in the breeding flock is the major factor influencing profitability. The average reproductive performance of a typical whiteface range ewe is shown in figure 8. Notice the stages where the majority of the reproductive wastage occurs. In order to optimize reproductive efficiency a sheep producer must understand the basic stages of the reproductive cycle of a sheep.

Ewe Puberty

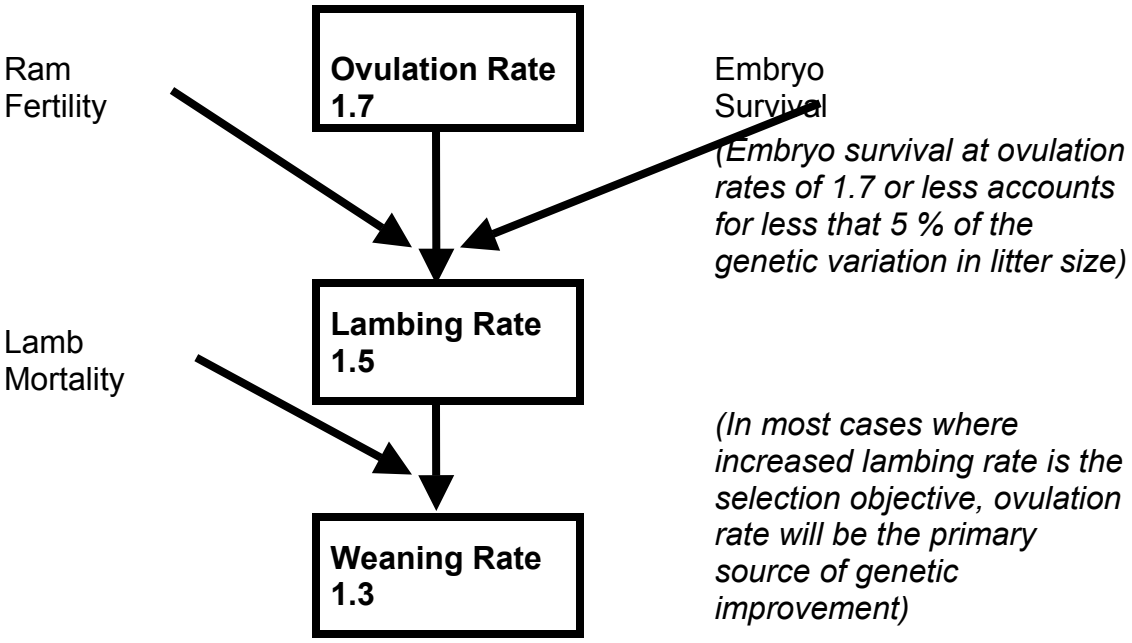
Puberty in the ewe lamb is the point in which she first exhibits estrus. In typical western range sheep operations ewes usually do not exhibit estrus the first year and thus first lambing occurs at two years of age. Farm flocks are increasingly shifting to lambing first at one year. Breeding ewe lambs will increase lifetime productivity of ewes, but it requires a higher level of management and feeding than if ewes are handled more traditionally. Breeding a ewe as a lamb can often increase her lifetime lamb production by as much as 15 to 20 percent.

However, breeding ewe lambs is not always economically advantageous. If ewes are to be successfully bred to lamb at 12 to 14 months of age, nutrition is critical. Sheep operations that have a high dollar input per ewe (intensive) are more likely to benefit from breeding ewe lambs than range sheep operations (extensive) where dollar input per ewe is normally lower.

Ewe lambs can be mated successfully without detrimental affects on subsequent reproductive performance providing they achieve a threshold body weight within the breeding season. However, ewe lambs that are to be bred to lamb at one year of age will require special treatment if success is to be achieved. Many management factors affect successful breeding of ewe lambs.

Because numerous factors influence conception rates among ewe lambs, it is possible for some sheep producers to get as high as 95 to 100 percent of their ewe lambs bred while others only get 10 to 40 percent bred.
Age at puberty is influenced by both breed and nutrition, as they influence growth rate of the lamb. Good nutritional management is necessary for lambs to mature and develop sexually. It is important to develop a realistic and sound feeding program to insure success and high fertility. There is no single correct management program for breeding ewe lambs. Management programs will vary

Average Reproductive Performance of a Typical Whiteface Ewe Under Range Conditions



depending on the goals and objectives of the manager and farm or ranch resources (labor and feed availability).

In general, ewe lambs must weigh approximately 65 percent of their mature body weight at the start of the breeding season in order to insure a high percentage of

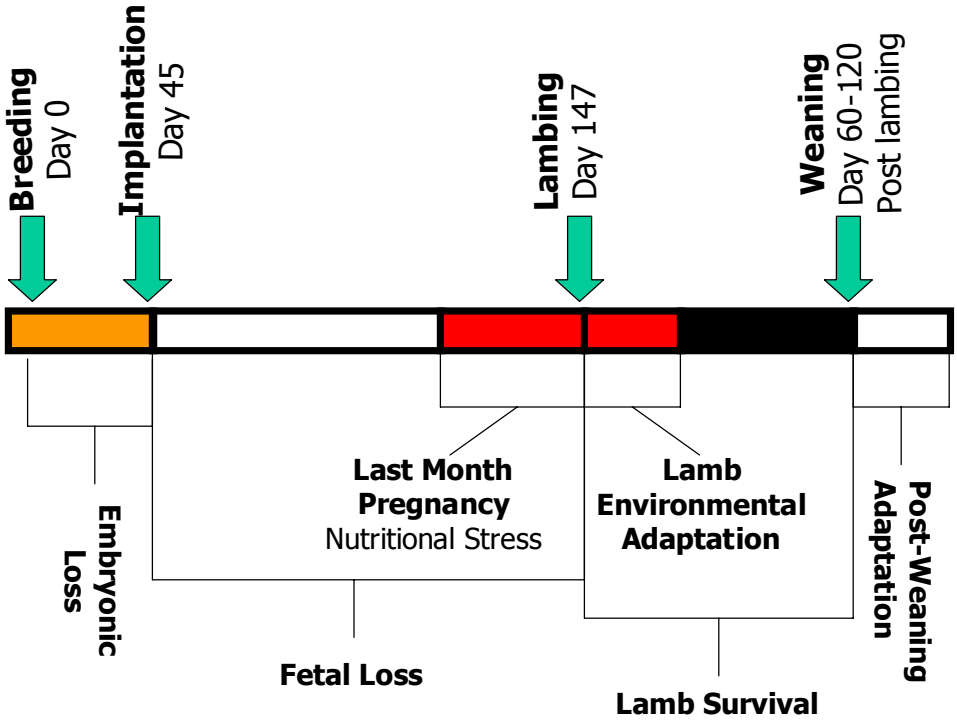
them breeding. However, for our more traditional breeds such as Rambouillet, Targhee and Columbia, a target weight of 70 percent of their mature body weight will produce more satisfactory results. In contrast, breed and/or breed combinations that contain one-quarter or more Finn breeding (Polypay) can probably get by with a target weight of 60 to 65 percent of their mature body weight. For example, if a sheep producer raises Columbia sheep and ewes have a mature body weight of 165 pounds, ewe lambs should attain an average weight of 115 pounds at the start of the breeding season (165 lbs. X 70%). With good management, this should produce conception rates of 75 to 90 percent. If ewe lambs are one-quarter Finn and mature ewes weigh 145 pounds, they would need to weigh between 87 and 94 pounds at the start of breeding.

Range sheep producers often feel that it is not economically feasible to feed ewe lambs well enough to reach the desired target weight at the start of the breeding season and may accept a lower target weight. Producers making this management decision must be prepared to accept lower conception rates. Many times in range operations the biggest lambs are singles and therefore selecting those ewe lambs that breed as lambs may encourage selecting for singles rather than multiple-birth ewe lambs. This would have a detrimental impact on overall flock prolificacy in the future.

Reproductive Cycle of the Ewe

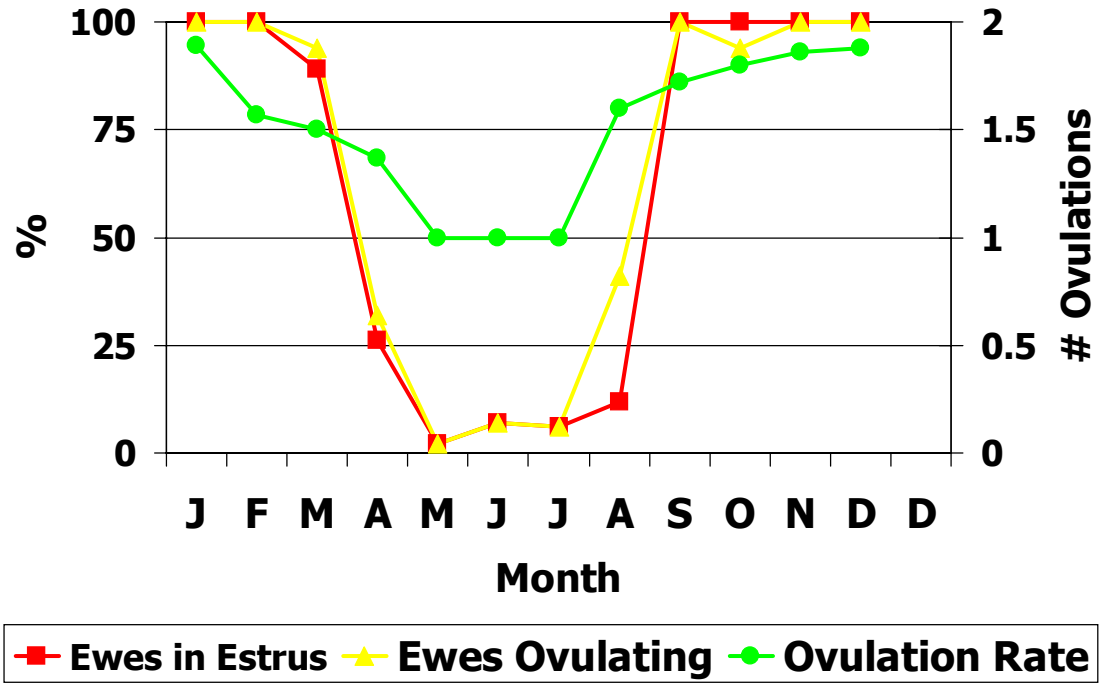
A ewe's reproductive timeline is depicted graphically below. The critical time periods include the last month of pregnancy (nutritional stress) and the first month after lambing (period of environmental adaption for the lamb). Again, periods in which reproductive wastage occurs are between ovulation and implantation for embryonic loss, between implantation and parturition for fetal loss and between parturition and weaning for lamb loss.

Reproductive time line for sheep



Breeding Season: Sheep are seasonal breeders or in other words will only breed during certain times of the year. Although the initiation and end of this period varies with breed of sheep and temperature, it tends to be most affected by day length. Basically sheep breed in decreasing or short day lengths. Common domestic sheep breeds have breeding seasons of five to seven months. In Montana, generally a few ewes will start cycling in September. By October all ewes will generally be cycling (see figure below). If some ram lambs have been left intact for replacements as is the situation with most purebred sheep operations, it is recommended that they be weaned by mid to the end of August to avoid them breeding some ewes. Peek ovulation rates generally occur in November.

Effect of Time of Breeding on Reproduction



Estrous Cycle: In sheep the length of estrous or time between periods of standing heat is about 17 days. Estrus or standing heat lasts about 30 to 40 hours with ovulation occurring during the last half of heat. A ewe, once she starts cycling in the fall, will cycle or come into heat about every 17 days. During a 35 day breeding period a ewe should have had the opportunity to cycle and be bred two times. A 60 day breeding period will allow the ewe three opportunities to become pregnant.

Gestation: Average gestation length or length of pregnancy for sheep varies from 144 to 151 days (about 147 days; figure 11). Individual pregnancies may vary from 138 to 159 days. Generally the earlier maturing meat breeds and the high prolific breeds such as the Finn have shorter gestation lengths (144 to 145 days), while the slower maturing finewool breeds (Rambouillet) have longer periods (150 to 151). Typically multiple lamb baring ewes will have slightly shorter gestation periods. It is not unusual for individual ewes within breeds to vary in gestation length by 3 to 5 days.

V. Sheep Nutrition

Ultimately, the production of sheep is controlled by their economic efficiency in converting available feed resources into products of economic value. Productivity of the pasture, rangeland or forage crop will largely dictate the maximum levels of productivity the sheep producer can achieve.

Supplying the nutrient needs of a sheep represents the single, largest expense in the total cost of raising sheep. Because of this, a solid understanding of nutrition is necessary in order to minimize the annual cost of production yet maintain optimum production levels. The National Resource Council (NRC) established a fairly precise set of nutrient requirements for sheep for various stages of production and with different levels of productivity. These resources represent the most current understanding of the needs of sheep for specific nutrients such as energy, protein, minerals and vitamins in order to meet clearly defined production objectives. Requirements presented in these publications should be used as guidelines and not as rigid standards. The most common misinterpretation of these recommendations is that each production system must provide for these nutrient levels and weight changes. Deviations from this system are possible, however, short-term deviations must be compensated for over the course of the entire production cycle if optimum production is to be maintained.

NUTRIENT REQUIREMENTS OF SHEEP (Adapted from NRC, 1985)

	DM Intake (lb)	Energy		Crude Protein (lb)	Ca (g)	P (g)
		TDN (lb)	ME (lb)			
Ewes (154lb)						
Maintenance	2.6	1.5	2.4	.25	2.5	2.4
Flushing	4.0	2.3	3.8	.36	5.7	3.2
Gestation						
Early	3.1	1.7	2.8	.29	3.5	2.9
Last 4 weeks gestation: (130-150 % lambing rate)	4.0	2.3	3.8	.42	6.2	5.6
Last 4 weeks gestation: (180-225 % lambing rate)	4.2	2.8	4.4	.47	7.6	4.5
Lactation						
First 6 weeks (singles)	5.5	3.6	5.9	.73	9.3	7.0
Last 6 weeks (singles)	4.0	2.3	3.8	.42	6.2	5.6
First 6 weeks (twins)	6.2	4.0	6.6	.92	11.0	8.1
Last 6 weeks (twins)	5.5	3.6	5.9	.73	9.3	7.0
	DM Intake (lb)	**Energy**		**Crude Protein (lb)**	**Ca (g)**	**P (g)**
		TDN (lb)	**ME (lb)**			
Replacement (90 lb.)						
Ewe lambs	3.1	2.0	3.3	.39	5.9	2.6
Ram lambs	4.0	2.5	4.1	.54	7.8	3.7
Lamb Finishing						
60 lb	2.9	2.1	3.4	.42	6.6	6.2
90 lb	3.5	2.7	4.4	.41	6.6	3.3

Nutrient needs

The nutrients of primary importance in sheep are: water; energy as measured by total digestible nutrients (TDN), metabolizable energy (ME) or net energy (NE), protein either crude or digestible protein; minerals and vitamins.

Water

Water, although often overlooked, is one of the most important nutrients required for life. An adequate supply of clean, fresh water is essential to efficient sheep production. Inadequate water consumption will reduce feed and forage intake and compromise performance. In fact, a deficiency of water will cause death much faster than a deficiency of any other nutrient. Daily water consumption of ewes will vary from .72 gallons during the cold winter months, to 1.5 gallons during the late winter months when temperatures begin rising, to as high as 2.2

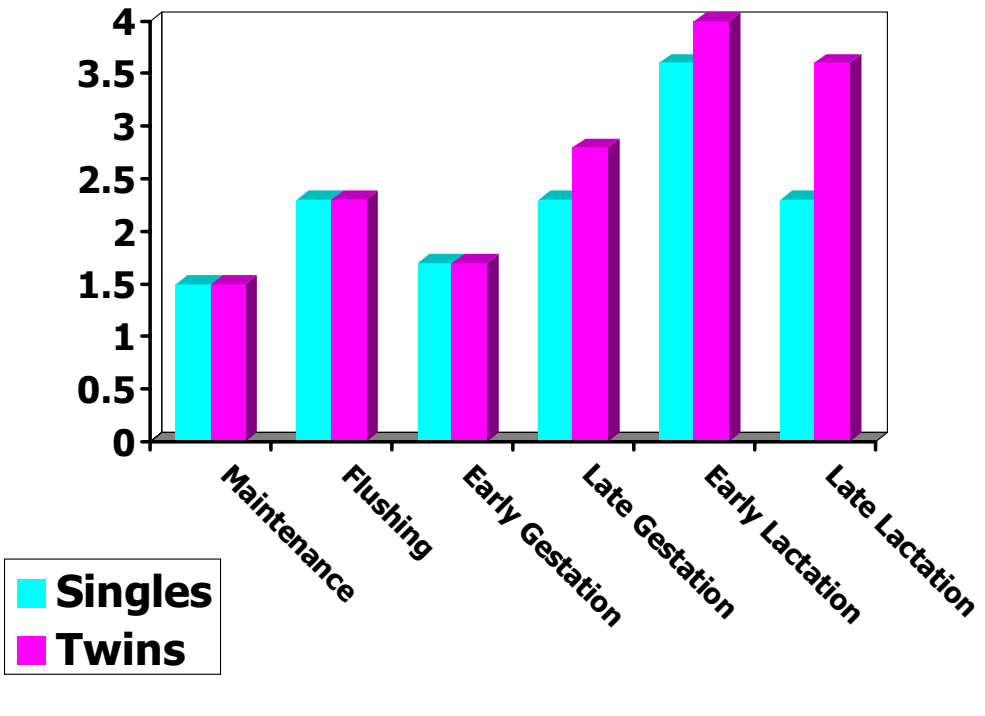
gallons when sheep consume dry forage such as saltbush. In some instances ewes can meet their winter water needs by eating snow.

Energy

Insufficient energy probably limits performance of sheep more than any other nutritional deficiency. It may result from inadequate amounts of feed or from feeds of low quality. The energy requirements of a ewe varies greatly with her stage of production.

Adequate amounts of energy are extremely important during late gestation and during early lactation. Energy shortages are often complicated by protein or mineral deficiencies. A sheep=s energy needs can, in most instances, be supplied by feeding good quality pasture, hay or silage. Additional energy is generally needed immediately before and after lambing, in conditioning ewes and rams for breeding and in finishing lambs. Grains such as barley, corn, wheat, oats and milo are generally used to raise the energy level when supplementation is necessary. During lactation a ewe=s metabolic energy requirements can at least partially be met by breaking down body fat reserves.

Energy Requirements (154 lb ewe)

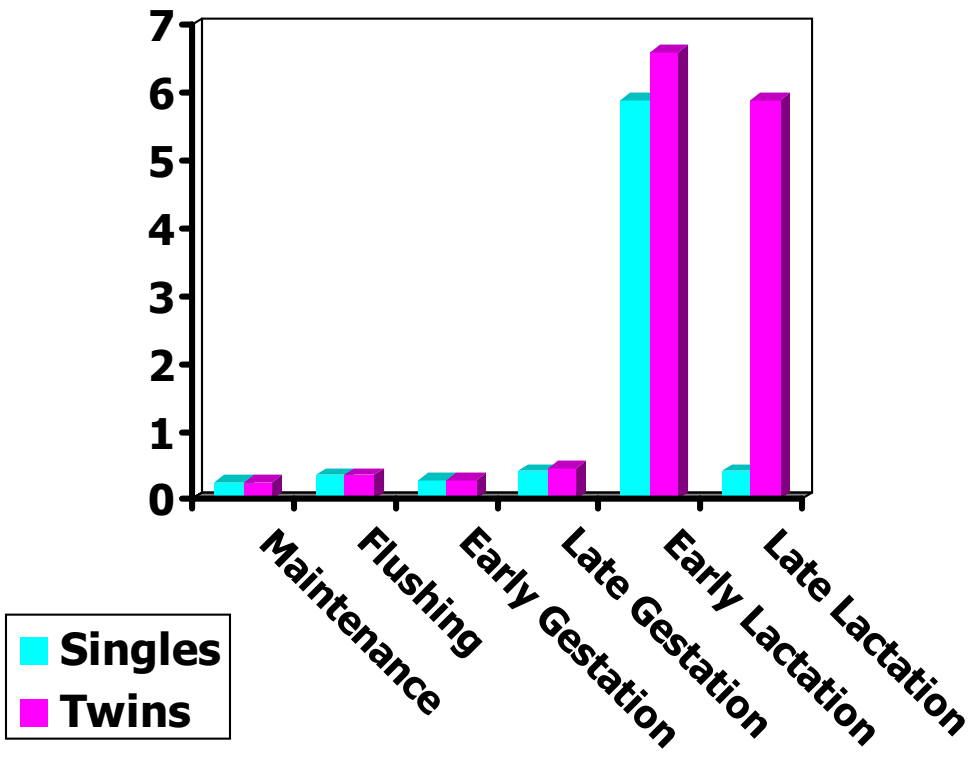


Protein

In most situations the amount of protein supplied in the diet is more critical than protein quality. Ruminants have the ability to convert low quality protein sources to high quality proteins by bacterial action. Protein available for digestion in the small intestine thus consists of microbial protein and feed protein that has escaped microbial breakdown in the rumen. Microbial protein synthesis is sufficient to supply the sheep=s protein needs provided adequate precursors are available, except during lactation in high milk producing ewes and in very young lambs when rumen activity is limited.

Green pastures, when comprising the complete diet, will provide adequate protein for most classes of sheep. When ranges are mature and bleached, or have been dry for an extended period of time, and when grass hay or high grain rations are fed, additional protein may be needed. High protein feeds are often added to creep rations because they are usually extremely palatable and stimulate appetite and digestive activity. In isolated instances, it may be beneficial to feed proteins with a high bypass value.

Protein Requirements (154 lb ewe)



Minerals

There are 15 minerals that have been demonstrated to be essential in sheep nutrition. They are: sodium, chlorine, calcium, phosphorus, magnesium, potassium, sulfur, cobalt, copper, iodine, iron, manganese, molybdenum, selenium and zinc. Although relatively precise requirements have been published for the different minerals, it should be recognized that in practice the true dietary requirements vary greatly depending on the nature and amount of these and associated minerals in the diet. A number of mineral balances (e.g. calcium and phosphorus, copper to molybdenum, selenium and vitamin E) must be considered when establishing the actual requirements under specific conditions. Most of these are met under normal grazing and feeding habits. In many situations poor animal performance is attributed to a mineral deficiency, when in fact it is due to something else. Under normal grazing situations minerals most likely to be deficient are salt (sodium chloride) and phosphorus. Selenium has been shown to be deficient in certain areas of Montana and the U.S.
Trace mineralized salt is usually fed to sheep free choice. However, care should be taken to be sure that the trace mineral mixtures are specifically developed for sheep and do not contain the high levels of copper commonly found in beef, dairy, swine and poultry trace mineral mixes. Most trace mineralized salt mixtures formulated for sheep provide 8 of the 15 essential minerals (Na, Cl, I, Co, Fe, Mn, and Zn). The minerals that are normally provided in sufficient amounts in natural feedstuffs include K, Mg, Fe, Cu and Mn. It is important to note that trace mineral salt does not usually supply phosphorus.

Salt: Salt serves many functions in the body. When deprived of salt, sheep will consume less feed and water. As a general rule, sheep producers should provide supplemental salt to their sheep. Salt is generally fed to ewes at the level of .25 to .4 ounces per head per day. It can be fed "free choice" or added to the feed mix.

Calcium and Phosphorus: Most pastures, hays and other forages contain adequate levels of calcium for sheep and thus calcium supplementation is seldom necessary. However, grains are somewhat deficient in calcium and thus supplementation is often beneficial when sheep consume diets that consist primarily of grains or corn silage.

Mature pasture and range forage is often deficient in phosphorus. Grains, however, are relatively high in phosphorus content. Since in most situations a high percentage of a sheep=s diet will consist of roughage or pasture, phosphorus supplementation is often beneficial. The most desirable way to supply additional phosphorus, when needed, is by adding it directly to the feed mix. This, however, is not always practical or feasible. It is sometimes more convenient to supplement the sheep=s diet with a high-phosphorus mineral mix. The ratio between calcium and phosphorus must be considered when balancing sheep rations. Although ratios of 5 or 6 to 1 (calcium to phosphorus) seem

satisfactory, a ratio of 2:1 is ideal for most sheep rations. Feedlot lambs or growing rams fed diets high in grain are prone to urinary calculi. In these situations the incidence of urinary calculi can be reduced by raising the calcium to phosphorus ratio to 3 or 4 to 1.

Copper: There is a delicate balance between the copper requirement and copper toxicity in sheep. In most cases, sheep can meet or exceed their dietary requirements for copper from normal feeds and thus do not require additional copper. Sheep are more susceptible to copper toxicity problems than most other livestock species. Errors in feed mixing frequently result in death due to copper toxicity.

Copper requirements of sheep are dependent on dietary and genetic factors and, therefore it is almost impossible to develop a set of well defined requirements. In fact, it has been shown that dietary amounts of copper that are adequate in one situation may be deficient in another and possibly toxic in a third situation. Concentration of molybdenum is a major dietary factor affecting the ewes copper requirement. Molybdenum forms an insoluble complex with copper which reduces its absorption thus increasing the dietary levels needed to meet requirements. Also Merino breeds of sheep generally are less efficient in absorbing copper from feedstuffs than British breeds of sheep.

Although it is impossible to give the exact requirements and toxic levels, the recommended copper allowance is 7 to 10 mg/kg DM when the Molybdenum content in the diet is below 1.0 mg/kg up to about 14-20 mg/kg when molybdenum content is above 3.0 mg/kg. It should be stressed that these are just guidelines and may vary drastically from situation to situation. When selecting a trace mineral mix for sheep, it is generally recommended to choose one that contains no or minimal copper. Mineral mixes providing over 4 mg of copper per ewe per day should be avoided.

Selenium: In sheep there is a very narrow range between the amount of selenium that is required in the diet and that which will be toxic. Diets containing less than .1 ppm selenium are deficient while those containing over 2 ppm are above the maximum tolerable level. White Muscle Disease in lambs results from a deficiency of selenium and possibly vitamin E. A marginal deficiency in selenium can result in reduced reproductive performance and increased lamb mortality. This deficiency can be prevented by giving injections of a commercial product containing both selenium and vitamin E. Selenium and or vitamin E can also be added to the entire ration, supplement or salt-mineral mix of sheep. Probably the most practical and effective way of supplying selenium to sheep is by feeding a salt-mineral mix containing selenium. There are many excellent ones on the market. Do not try to mix your own. When supplementing selenium (either by feeding or injection), producers should follow the manufacturer=s or veterinarian=s recommendations very closely. There may be some instances in

sheep nutrition where, "If a little is good, a lot is better." However, "a lot" of selenium can be lethal.

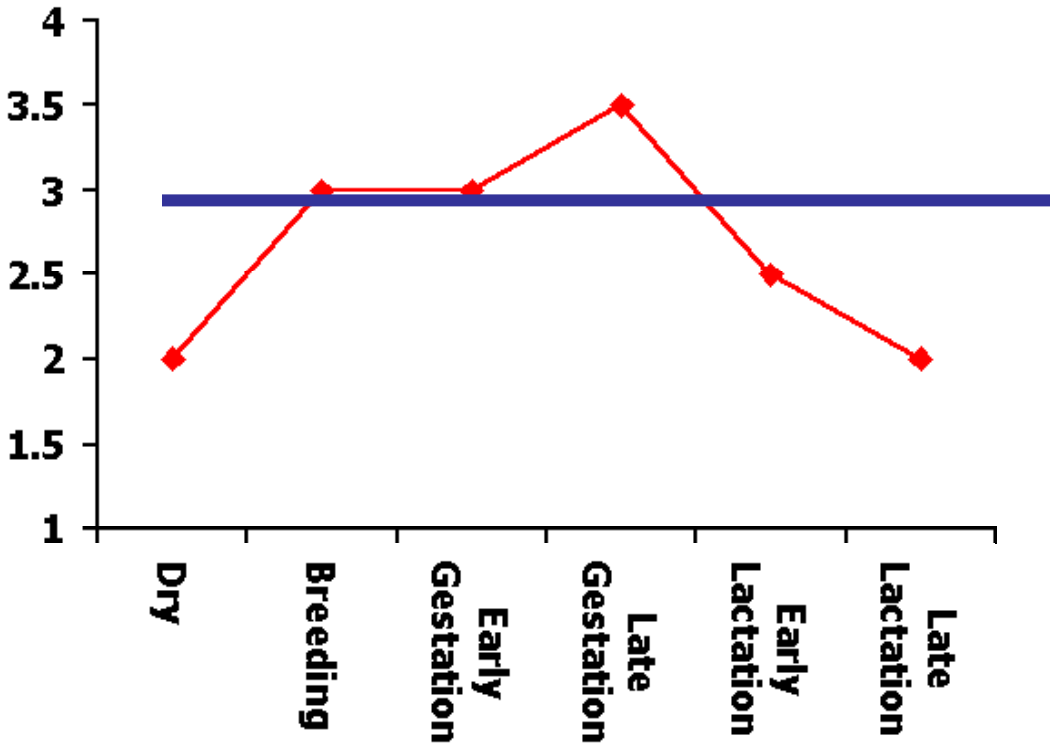
Vitamins

Mature sheep require all of the fat-soluble vitamins: A, D, E and K. They usually do not require the B vitamins since these are synthesized in the rumen. Normally, the forage and feed supply all of the vitamins in adequate amounts. Vitamin A can become deficient if sheep have been grazing on dry or winter pastures for an extended period of time. Sheep, however, store Vitamin A for a considerable time, and if ewes have been on green forage or have had access to high-quality legume hay, Vitamin A is usually not deficient. Vitamin D deficiencies may develop in confined sheep. Sheep raised outside will usually have sufficient vitamin D as sunlight builds a store of this vitamin in the body.

Body Condition Scoring

The most productive ewe in any flock of sheep is neither too thin nor too fat. Although measurements of body composition on live animals are estimates, producers must utilize the best system available. Body weight alone is inadequate because of apparent differences in mature body size amoung different breeds and individuals within a particular breed. The use of both body weight and condition scores can help producers make important feed management decisions. Body condition scoring is a simple but useful procedure which can help producers make management decisions regarding the quality and quantity of feed needed to optimize performance.

Expected Body Condition Score Changes Throughout The Ewes Production Cycle



Condition scoring is a system of describing or classifying breeding animals by differences in relative body fatness. It is a subjective scoring system but provides a fairly reliable assessment of body composition. In sheep, scores range between 1 and 5 with the lower-scoring ewes being the least fat and the highest-scoring ewes being the fattest. A ewe in average body condition would have a score of 3. Usually 90% of the ewes fall within the 2, 3 or 4 range and usually 70 to 80 percent of the animals will usually fall within a range of two condition scores.

Score	Description
1	Ewes in this body condition have no fatty tissue detectable between skin and bone. These ewes appear weak and unthrifty.
2	Ewes in this body condition have only a slight amount of fatty tissue detectable between skin and bone. Spinous process are relatively prominent. These ewes appear thrifty but have only minimal fat reserves.
3	Ewes in this body condition have average flesh but do not have excess fat reserves. This condition score includes ewes in average body condition.
4	This condition score includes ewes that are moderately fat. Moderate fat deposits give sheep a smooth external appearance
5	Includes ewes that are extremely fat. Excess fat deposits can easily be seen

	in the brisket, flank and tail-head regions. These ewes have excess fat reserves to the point that productivity may be impaired.

A sheep producer will find that body condition scoring is fairly easy and they will develop confidence in their ability relatively quickly. Condition scoring involves both visual and hands-on appraisal. Scoring is accomplished by using the hand to feel the fullness of muscling and fat cover over and around the vertebra in the loin region. While the ewe is standing in a level and a relaxed position the fingers and thumb are used to determine sharpness of the spine and transverse process behind the last rib and in front of the hip bone (loin area). In addition it may be helpful to determine the extent of fat covering over the fore ribs. After all factors have been evaluated an overall condition score is assigned. If a producer is unsure as to whether a ewe is a 2 or 3, a condition score of 2.5 should be used. As a general rule of thumb mature ewes vary 6 to 7 percent in body weight for each half unit change in body condition score. For example, a ewe in condition score of #3 weighing 150 pounds would weigh between 165 and 175 pounds if she were in condition score #4.

Condition Scores

Condition Score 2 **Condition Score 4**

It may be impractical for large sheep producers to condition score all ewes; however, if a producer condition scored approximately 10-20% of the flock this would be adequate to get an estimate of the condition of his entire flock. Regular condition scoring and action on the results will ensure healthier ewes and more pounds of lamb and wool marketed per year.

Ewe Nutrition

Optimum feeding systems can vary from the intensive feeding of confined sheep, where they are entirely dependent on harvested feeds at one extreme, to the supplementation of flocks mainly dependent on range forage. An optimum

feeding system consists of a planned nutritional regime that will result in an expected biological and economic response.

The nutritional status of the ewe at anytime during the year has an influence on productivity. Nutrition in the weeks just prior to and after breeding determine the number of lambs conceived. Nutrition during pregnancy determines the number of lambs born alive and lamb birth weights which are directly related to subsequent lamb survivability. Proper nutrition during lactation is critical for adequate milk production. After weaning, nutrition is important for replenishing body reserves, preparing the ewe for another production cycle.

Direct observation of a sheep=s nutrient needs has provided a comprehensive framework for the formation of optimum feeding strategies. However, rarely do these strategies involve meeting the ewes exact nutrient requirements at each stage of her reproductive cycle. Instead, for economic, practical and sound physiological reasons they involve periods where the nutrient intake exceeds requirements and other periods where nutrient consumption is below the requirements. Body composition at a given point in the production cycle may influence both production response at that point and response to varying levels of nutrition. The goal is to achieve a balance in body composition over the yearly reproductive cycle.

One of the best ways to determine how a ewe should be fed is by monitoring her changes in weight. Ideally, a ewe should lose 5 to 7 percent of her body weight during lactation, recover this during the post weaning period and then gain weight during gestation.

A sheep flock consists of ewes of different sizes, body conditions and different levels of production and therefore varying nutritional needs. Although it is impossible to treat each ewes needs separately, there are times that it is beneficial to divide the flock into groups of ewes having similar needs, feeding each group accordingly.

Breeding/Flushing

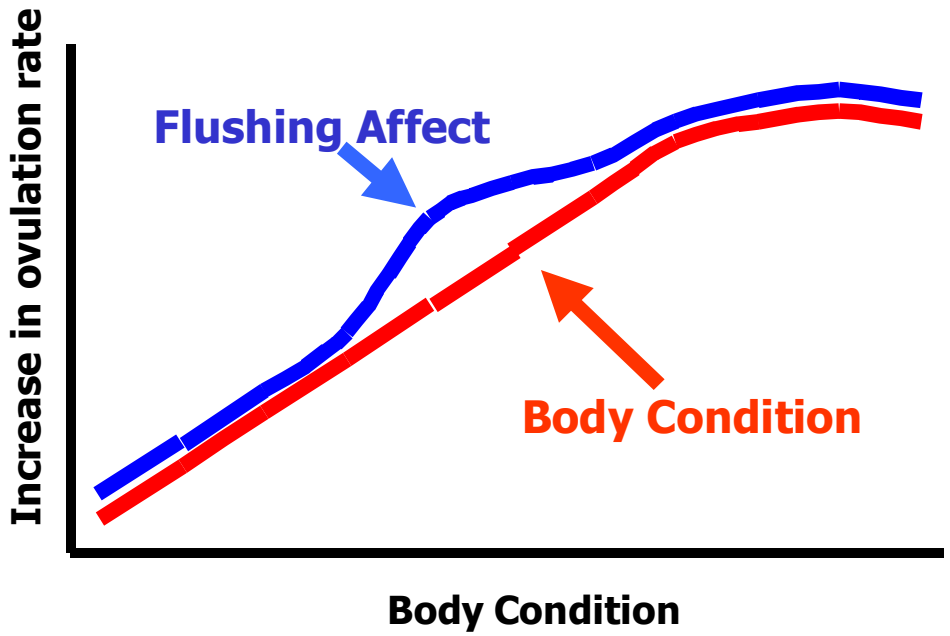
Flushing is the practice of increasing intake of ewes prior to and during mating. Its purpose is to increase the ovulation rate, and subsequently, the lambing rate. It can be accomplished by turning ewes onto a lush, high quality pasture just prior to breeding. If such pasture is not available, the same result can be obtained by supplementing the ewes regular diet with about .25 to .50 pound of grain or pellets per head, per day. Flushing usually begins about 2 weeks prior to joining with rams and continues for about 2 to 3 weeks into the breeding season, for a total flushing period of 4 to 6 weeks.

The response to flushing can be divided into two components, the static effect of increased body weight or body condition, not specifically related to the breeding season, and the dynamic effect which is specific to the breeding season.

As a general rule, each 10 pound increase in body weight increases lambing rates by about 5 to 6 percent. The dynamic flushing effect, on the other hand, is distinguishable from the live weight effect and is specific to the immediate pre-mating and mating periods. Ovulation rate appears to respond to short term increased nutrition within a specific, intermediate range of body condition. Although results vary greatly, most studies suggest that flushing will improve lambing rates by 10 to 20 percent in ewes with body condition scores of 3 or below. However, when ewes have body condition scores of 4 or higher, little additional benefit will be obtained by flushing.

Although it is not likely that all the benefits ascribed to flushing will be fully realized under all conditions, the general feeling persists that the practice will result in: 1) more eggs being shed and therefore higher lambing rates; 2) the ewes coming in heat more promptly; and 3) more certain and prompt conception -- with lambs arriving in the early part of the lambing season.

Affect Of Body Condition And Flushing On Ovulation Rate.



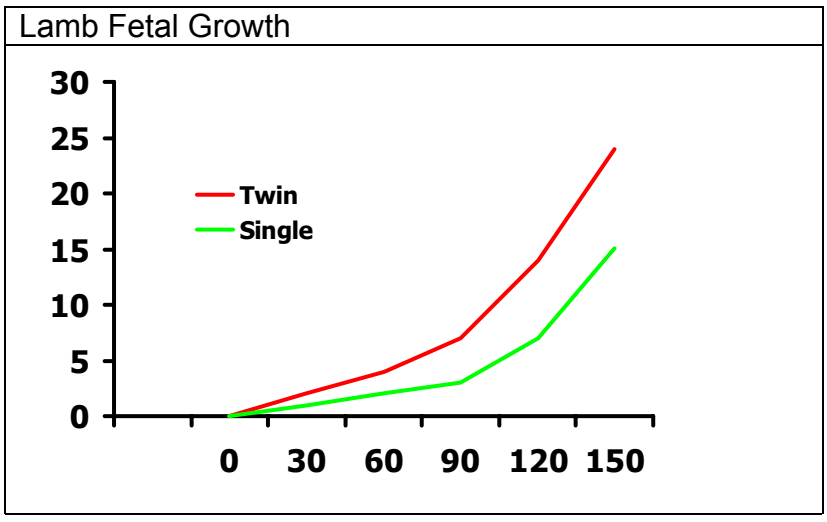
Gestation

Poor nutrition during pregnancy can lead to lamb deaths before, during and soon after lambing due to numerous complex interactions. Many of the lamb deaths that occur shortly after birth can be attributed to nutritional factors during

pregnancy which influence placenta growth, fetal development and ewe mammary gland development. Quite often cold weather is blamed for lamb losses when in fact the major contributing factor was inadequate nutrition during pregnancy. Critical time periods for placental development, fetal growth and mammary gland development is between day 30 and day 90, after day 90 and after day 120 of pregnancy, respectively.

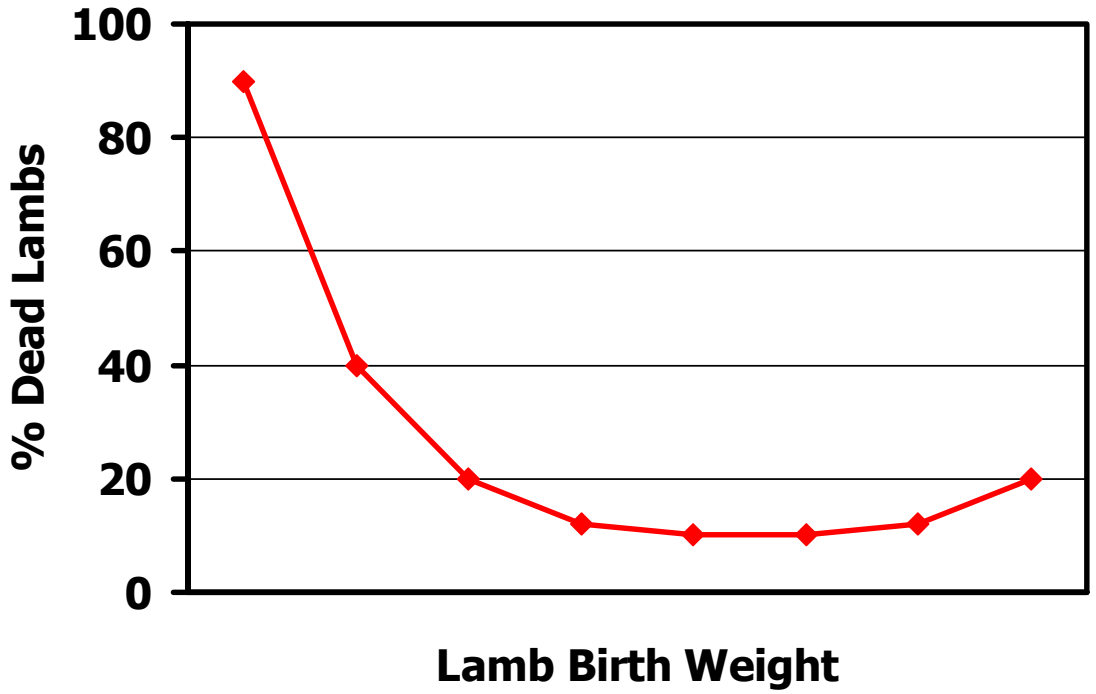
Early & Mid: During pregnancy the ewe must be fed enough to meet her requirements for maintenance, fleece production, fetal and associated tissue development and growth if the ewe is not fully mature. Since fetal growth is minimal during the first 15 weeks of pregnancy the ewes nutrient requirements during this time are only slightly higher than they are for maintenance. There are however some important functions that occur during this period and thus nutrition cannot be ignored. During early gestation the embryo becomes attached to uterine walls (first 45 days of pregnancy). Extremes in nutrition (severe under or over feeding) during this period is detrimental to this process. A drastic reduction in nutrition during the first 45 days after conception can result in significant reductions in reproductive performance. Also the majority of placental development occurs during mid gestation (day 30 to 90 of pregnancy). Research suggests that if in good condition at conception, ewes can lose a little weight or condition during mid-gestation. However, excess weight loss will result in poor placental development, which will in turn result in lower fetal growth rates and reduced lamb survival rates. Good nutrition during late pregnancy is wasted if adequate placental development has not occurred.

Late: The last six weeks of gestation is the most critical period in ewe nutrition. During this period approximately 70 percent of the fetal growth occurs. Poor nutrition during late pregnancy will cause lighter lambs at birth, uneven birth weights in twin and triplet born lambs, reduced wool follicle development and low energy reserves in the new born lamb. Lowered energy reserves in the newborn lamb will result in increased lamb losses especially in colder weather. Severe under nutrition will lead to pregnancy toxemia and possibly ewe death.



Lamb birth weight is a major factor affecting lamb mortality. Birth weights vary from 3.5 to 20 lbs. Although these differences are associated with breed, dams age and litter size, they are highly dependent on ewe nutrition and in particular energy intake during the last month of pregnancy. Inadequate energy intake during this period will result in lowered birth weights which in turn is a major factor affecting lamb mortality. There may be as high as a 12 percent increase in lamb mortality for every 2 pound decrease in lamb birth weight. On the other hand, excessive levels of feeding may result in lambs with increased birth weights leading to lambing difficulties.

Birth Weight & Lamb Mortality



Ewes in late pregnancy require 50 percent more feed if bearing a single lamb and about 75 percent more feed if bearing a twin lamb, than they do earlier in gestation. If the ewe is fed a high-roughage diet, she will usually not be able to consume enough to supply her requirements for energy. When on high-roughage diets it is generally advisable to supplement the ration with .5 to 1 pound of grain during the last 3 to 4 weeks of pregnancy. In situations where large numbers of multiple births are expected, it is desirable to begin graining ewes as early as six weeks prior to lambing. All changes in grain feeding should be gradual.
During this period there is a limit to the extent to which body fat reserves can be utilized, as excessive mobilization of fat results in pregnancy toxemia. Pregnancy toxemia (pregnancy disease, twin lamb disease or ketosis) is a result of

improperly-fed ewes in late pregnancy. Affected ewes are most often carrying multiple lambs.

Lactation

After lambing, the feed allowance of the ewe should be increased according to her needs. A ewe will usually reach maximum milk production by two to three weeks after parturition. Milk production generally declines fairly rapidly thereafter. Assuming the ewe has the capacity to produce milk, she will produce at this level only if challenged by the lambs nursing her. Since single lambs normally are not able to consume all of the ewe=s milk, the ewe will adjust her milk production downward to the level the lamb is consuming. Ewes nursing multiple lambs will produce 20 to 40 percent more milk than those nursing singles and thus have greater nutritional requirements. For maximum rate and efficiency of lamb gains, it is desirable to separate ewes with multiple lambs from ewes with singles and feed each according to their nutritional needs.

Early: In the first month after lambing the lambs growth is primarily dependent upon milk production. Milk is critical in the first 3 to 4 weeks of the lamb=s life and in this period the correlation between milk intake and live weight gain is approximately .90. Lambs receiving inadequate amounts of milk can compensate to some degree by increasing their consumption of feed. However, because of the differences between the digestibility of milk and feed, dry matter intake of feed must increase by about 3 to 5 units to compensate for each unit decrease in milk consumption.

A ewe suckling two lambs growing at .6 pounds per day is as productive as a dairy cow yielding 65 pounds of milk per day. To prevent loss of her body tissue, daily intakes of over 7.2 Mcal. of metabolizable energy (three times maintenance) are required. In practice this cannot be achieved. As in high producing dairy cows, it is impossible to feed a high producing ewe enough feed to prevent body weight loss during early lactation. Fortunately early lactation is a period in which body fat can safely be used to meet some of the high energy demands of lactation. During this period a loss in body condition score of 1.0 is quit acceptable, provided she was in proper body condition at lambing (3.5+). However, the ewe must have sufficient reserves of body fat to mobilize and use for milk production.

Fat can only be used efficiently for milk synthesis if the ewe is absorbing adequate amounts of amino acids from her diet. Thus, protein intake is critical during this period if maximum milk production is to be achieved in high milk producing ewes. Thus protein as well as energy is critical in a ewe's diet during early lactation.

Late (last 4-6 weeks lactation): Although some ewes continue producing a good supply of milk throughout the nursing period, milk production in most ewes declines fairly rapidly after two to three weeks and is of minor importance after 8

to 10 weeks. Milk production during late lactation is relatively low and nutrient needs are substantially lower than they were during early lactation. Also by this time, ewes are usually on lush spring grass which will be adequate in most cases.

Post-weaning

This is a time of rest for the ewes. It is the period of time that the ewe=s body condition can be adjusted so they are in appropriate body condition at breeding.

VI. Sheep Flock Management Calendar

Sound health, nutrition and management programs are the keys to a successful sheep enterprise. This calendar does not contain all the answers to a sound sheep management program for all enterprises, but can serve as a guide for developing individual programs. Management programs will differ with the type of enterprise (range or intensive), the geographic area and the goals of the manager. In a commercial flock the management program should be based strictly on economics and therefore tailored towards net worth. In a registered or Apet@ flock, breeding and sentimental values will allow more elaborate programs.

Vaccination programs and schedules will vary greatly and those suggested in this calendar should only be used as a guide in establishing your won flock health program. Depending on the type of sheep operation, disease or vaccination background of the ewes and/or location, you may be able to eliminate some of the health practices suggested in this calendar. By the same token, some preventative health practices or vaccinations may need to be added. Also, the proper schedule for giving the different vaccinations may vary slightly from those listed in this calendar with the type or brand of product used. Always read and follow the label directions when using any drug product. A qualified veterinarian has the necessary training and should be able to help you develop a sound and economical flock health program for your operation.

ROUTINE MANAGEMENT
(Completed as Needed)

- Trim Feet
- Treat for Internal Parasites
- Identify Cull Ewes
  -- Mark ewes when something is noticed that would result in that ewe being culled so they can be easily sorted out.
- Watch Ewes Closely
  -- Sort off thin ewes and give extra feed
  -- Treat sick ewes

- If Sheep Dies, Find Out Why
  --Often the most important sheep in your flock is the first one to die. If you do not know why it died, you can not correct the problem.

PRE-BREEDING

(Fall)

- Sort, Bag and Cull Ewes
- Breeding Soundness on Rams
- Cull Rams
- Buy Rams (& Ewes)
- Keep Rams Out of Ewes

PRIOR TO BREEDING

(14 days prior turning out rams)

- Begin Flushing Ewes
  - Flushing affect can be achieved by turning ewes on high quality pasture or by supplementing diet with 1/4 lb of grain per head per day.
- Increase Rams Plane of Nutrition
- Vaccinate new ewes for Vibrio & EAE (If called for in flock health program)

BREEDING SEASON

- Have Rams in Good Shape
  - They should do their year's work in about 30 or 40 days.
  - Use more than one ram per breeding group. You are taking a chance if you use only one ram .
  - Use 1 mature ram or 2 ram lambs per 35 ewes. Can use fewer rams if rams are highly fertile.
- Breed Ewe Lambs Separate From Older Ewes
  Continue Flushing
  - Flushing should continue until ewe is bred.
- Do Not Winter Rams With Ewes
  - Leave rams in no longer than 60 days - 40 days would be more desirable. During a 40-day breeding every ewe should have had the opportunity to cycle and be bred twice.

EARLY PREGNANCY

(One Month After Breeding)

- Stop Flushing -- Prevent Weight Loss
  - Precautions should be taken to prevent a sharp weight loss during the first two to three weeks after breeding. This is the time period when the fertilized egg attaches to the walls of the uterus and this process could be adversely affected by improper nutrition.
- Watch Ewes Closely
  - Watch to see if ewes are still cycling.

MID-PREGNANCY

(1 to 4 Months Post-Breeding)

- Maintain Ewes in Thrifty Condition
  - Nutrition should be adequate to support placental development. Feed poorer quality roughage during this period saving better quality forage for lactation.
- Condition Score Ewes
  - Thin ewes should be sorted off and fed extra so they can catch up.
- Vaccinate For Vibrio & EAE (If called for in flock health program)
  - Second injection on new ewes should be given 60 to 90 days after the first and the annual booster in ewes vaccinated in previous years should be given in mid-pregnancy.

LATE PREGNANCY

(Last Month)

- Supplement Ewes
  - High Producing Ewes - Starting about 6 weeks prior to lambing, feed about 2 lb of grain/hd/day and be at 1 pound/hd/day at lambing. Low Producing Ewes - Starting about 3 weeks prior to lambing, feed about 2 lb of grain/hd/day through lambing.
- First Enterotoxemia Injection in New Ewes
  - Injection should be 4 to 6 weeks prior to lambing.
- Shear Ewes
  - About 1 month to 2 weeks prior to start of lambing.
- Treat Ewes for External Parasites
  - Make sure product can safely be used on pregnant ewes.

PRIOR TO LAMBING

(2 weeks Prior to Lambing)

- Give All Ewes Enterotoxemia Injection
  - Second injection on new ewes (2 weeks after first and 2 to 4 weeks prior to lambing).
    Treat for Internal Parasites
  - Make sure product is safe for pregnant ewes.
  - May want to treat when moving ewes out of jugs.
- Bring First Lambing Ewes to Shed - Expect First Lamb Early
  - Normal length of pregnancy is 147 days, however, should expect first lamb one week early.

LAMBING TIME

(About 140 Days After Rams Are Turned Out)

- Be There/Keep Records
- Brand Ewes and Lambs With Lambing Number
- Clip, Dip & Strip

    - Clip umbilical cord about 1 to 2 inches from lambs body and Adip@ the remaining stump in strong (7%) tincture of iodine. Check ewe to make sure both teats are fully open and functioning.
- Make Sure Lamb Nurses
    - Lamb should receive colostrum within 1 to 2 hours after birth.
- Warm Up Chilled Lambs

AFTER LAMBING - IN JUGS

(Birth to 3 days of age)

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

AFTER LAMBING - IN MIXING PENS

(3 days to 1 month of age)

- Group Sizes - Keep Small
    - Four to 10 ewes and their lambs (no more than about 10 lambs per pen).
- Keep Ewes With Singles and Twins Separate
    - Ewes with twins will need more attention and feed.
- Check Every Lamb At Least Once Daily
    - Watch closely for signs of pneumonia and starvation.
- Provide Shelter for Lambs in Extremely Cold Weather
    - One of the main causes of death is pneumonia. Some producers have the first set of gathering pens under shed.

LATE LACTATION

(1 Month After Lambing)

- Vaccinate Lambs for Enterotoxemia
- Watch ewes and Lambs For Signs of Internal Parasites And/Or Coccidiosis
- Date to Weaning Lambs Depends on Management Objectives
    - Thirty days to 6 months of age (As a general rule lambs can be weaned at 60 days of age or 45-50 lbs. With minimal problems.
    - Wean ewes from lambs (If lambs are allowed to stay in familiar surroundings where they are accustomed to the feeders, etc. there will be less weaning stress on the lambs).

AFTER WEANING

- Time of Rest for Ewes
- Time to Adjust Ewes Condition So They Can Affectively be Flushed Prior to the Next Breeding Season