

Sheep Production Guide

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A sheep enterprise can be ranch size or it can fit into a few acres. It can be a full-time occupation, but it also is well suited for diversified and part-time farmers, or it can be expertly handled by the spouse or younger members of the farm family.

Sheep are profitable when the enterprise is well managed. Each ewe unit can produce 200 lb of red meat in 100 to 120 days with good breeding, nutrition, and management practices.

Every sheep producer should strive to increase the productivity of the ewe flock. Costs for labor, feed, and equipment are nearly the same whether a ewe produces one or two lambs. The potential exists for a 180-percent lamb crop, and that should be your goal no matter how many ewes you have. Strive to attain a lamb crop of *at least* 150 percent.

This guide outlines management practices to help you reach these goals.

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Sheep management calendar

A management calendar of suggested practices is useful for both beginning and experienced producers. Sheep production revolves around the lambing season. Therefore, the production cycle starts approximately 6 months before the date you want your first lambs to be born.

The following guidelines are not intended to fit every sheep operation but merely to suggest potentially useful practices. Because every sheep operation is different, a specific sheep calendar should be tailored to fit each flock's needs. The activities suggested below are discussed in detail elsewhere in this publication.

Prior to breeding

- Purchase rams 45 to 60 days before the breeding season starts.
- Drench ewes and rams for internal parasites.

Selecting your own calendar

You can choose either early lambing (December through March) or late lambing (late March through May). Your choice depends on which of the factors listed below are most important, given your specific operation and location.

Advantages of early lambing

- Farmworker labor requirements for lambing come at a slack time in relation to other farm activities.
- Lambs gain more rapidly.
- Hot weather and internal parasites are not a major problem in lamb performance.
- Lambs usually are sold on a higher market.

Advantages of late lambing

- Building and equipment requirements are less.
- Feed costs usually are lower.
- The number of lambs born per ewe may be higher.
- Better weather conditions usually result in higher survival rates for lambs.
- Late lambing maximizes use of pastures, thus requiring less grain and stored forages.

- Trim feet 30 days before the start of the breeding season.
- Shear rams.
- Provide a cool environment for rams.
- If rams are too thin, give them some grain. Aim for a 3.5 body condition score (see page 6).
- Vaccinate ewes for campylobacteriosis (vibrio).
- Begin flushing ewes 2 to 3 weeks before the start of the breeding season and continue into breeding.

Breeding

- Use a marker on rams; change the color every 17 days.
- Observe breeding activity of rams, remove boss rams, and rotate rams.
- If weather is hot, run rams with ewes at night and keep them in a cool environment during the day.
- Remove rams after 51 days.

Prior to lambing—early pregnancy (first 15 weeks)

- Vaccinate all ewe lambs and new ewes in the flock with their second injection for campylobacteriosis (vibrio); see page 18.
- Watch the general health of ewes. Sort off thin ewes to bring up body condition score.
- Use lower quality roughages and other marginal feedstuffs at this time. Save higher quality feeds for later stages of pregnancy.

Prior to lambing—late pregnancy (4–6 weeks before lambing)

- Begin increasing nutrition by supplementing with grain, high-quality roughages, or pasture.
- Trim and check feet.
- Treat for internal parasites.
- Vaccinate ewes for enterotoxemia (about 30 days prior to lambing).

- Shear at least 2 weeks prior to lambing. If you do not shear the ewes at this time, crutch or tag them.
- Prepare lambing quarters, check supplies and equipment.

Lambing

- Be ready for the first lambs 142 days after turning rams with ewes. The normal gestation period is 148 days, but some ewes may lamb early.
- Watch ewes closely. Lambing season is the time to concentrate your labor. The extra effort will be repaid with more lambs at weaning. Hiring additional help might be money well spent.
- Provide assistance when needed.
- Place ewes that lamb in jugs or lambing pens.
- Clip, Dip, Strip, and Sip: Clip the navel cord to 1.5 inches. Dip the navel in 7-percent tincture of iodine. Strip the teat of the ewe to remove the wax plug from the teat canal. See that the lamb gets its first sip of colostrum.
- Check lambs and ewes in jugs several times each day to ensure that ewes are claiming lambs and that lambs are getting enough to eat.
- Remove ewes and lambs from jugs after 1 to 2 days and place them in small groups (four to eight ewes) for further observation. After a few days, combine these groups into workable units. Separate ewes with twins from those with singles.
- Begin to feed ewes at recommended levels for lactation about 3 days after lambing.
- Watch lambs for signs of pneumonia and scours.
- Give lambs an injection of Vitamin E+ selenium.
- If soremouth is a problem in your flock, vaccinate lambs at 1 to 2 weeks of age. Vaccinate lambs for enterotoxemia if ewes were not vaccinated prior to lambing.



- Castrate and dock lambs as soon as they are off to a good start (2 days to 2 weeks of age).

End of lambing

- Continue to feed ewes for lactation based on the number of lambs suckling. Feed at this level until 6 weeks after lambing.
- If creep feeding is part of your lamb production system, get lambs started on creep feed when they are 10 to 14 days old.
- If lambs were not vaccinated for enterotoxemia shortly after birth (see “Lambing,” above), give them their first vaccination at 5 to 7 weeks of age. Give a booster to those lambs already vaccinated.
- Observe ewes for signs of mastitis and lambs for signs of starvation.

Weaning

- Wean lambs at 50 to 60 days of age or older.
- One week prior to weaning, discontinue grain feeding of ewes and reduce the quantity and quality of hay.
- At weaning, place ewes on poor-quality hay to help stop milk production and reduce mastitis problems.
- Continue to feed lambs on a growing, finishing ration.

Weaning to prebreeding

- Drench ewes and rams for internal parasites.
- Cull and market barren ewes. Use your records.
- Market lambs either as feeders or finished lambs when they reach appropriate size and weight.
- Purchase replacement ewes and rams (if needed and you do not raise your own replacement ewes).
- Observe the condition of ewes; don't allow them to get overly fat or too thin.

Production records

The goal of every sheep producer should be to increase productivity of the ewe flock. Without accurate records, it is difficult, if not impossible, to assess ewe productivity. Good records will help you know where you need to improve and set future goals. Use production records to:

- Evaluate productivity of the ewe flock.
- Identify top-producing ewes so you can keep their lambs for replacements.
- Cull poor producers.
- Evaluate ram breeding performance.
- Show differences in lambs' ability to gain weight.
- Improve the volume and quality of wool.
- Supplement visual appraisal.

Start by keeping minimal records and add information as your needs grow. The following are some basic recordkeeping guidelines:

- Permanently identify all ewes and lambs with ear tags.
- Record dates—breeding, birth, weaning, shearing, etc.
- Weigh lambs at birth, if possible. Record the type of birth and whether the lamb is raised as a twin or single.
- If a lamb dies, record the date and cause.
- Weigh lambs again at weaning.

- Weigh and record fleece weights at shearing.
- Record the adjusted weaning weight (see below).
- Include a “remarks” column in your records. Memories are short; it's easier to head off trouble if periodic review of your notes shows consistent clues.
- Yearling weights are seldom taken, but they can be an important part of your selection program if you raise your own replacements.

Other records you might find helpful are:

- Percentage of ewes exposed to rams that actually lamb
- Percentage of ewes that settle during the first two heat cycles
- Number or percentage of lambs born per ewe exposed
- Number or percentage of lambs born per ewe lambing
- Number or percentage of lambs weaned per ewe exposed
- Number or percentage of lambs weaned per ewe lambing
- Percentage of mortality from birth to weaning

Adjusted weaning weight

Lamb performance to weaning is important because you want to know the effects of the ewe on the lamb's growth. A production testing program is not a contest. Its purpose is to locate the best-producing ewes and rams in each flock. They are “keepers.” Culling the poor performers and breeding the keepers will improve the flock genetically.

One performance measure is the lamb's **adjusted weaning weight**. The age of the lamb, age of the dam, type of birth, and type of rearing all influence this performance rating.

An *unadjusted* weaning weight is misleading. A lamb that reaches expected weight in fewer days probably is better than one that takes longer, but that doesn't tell the

whole story. A mature ewe usually produces lambs that perform better. Thus, if the laggard lamb is from a younger ewe, the unadjusted weight could mask a dam with high potential. You might cull this ewe from the flock, losing the opportunity for exceptional lambs in the future, because the unadjusted weight of her lambs at weaning doesn't compare well to lambs from older ewes.

To calculate adjusted weaning weight, you need to know the weight of the lamb at birth and the weight at weaning. If the range in age of the lambs is large, it is best to divide them into two groups for weighing.

After weighing a lamb at weaning, calculate its adjusted weaning weight as follows.

1. To adjust weaning weight for the age of the lamb, first subtract birth weight from weight at weaning. Then divide by age (in days) of the lamb when the second weight was taken. This gives the rate of gain from birth to weaning. Next, multiply the rate of gain by the **standard age** (age to which adjustment is made, which may be from 70 to 90 days). Then add the birth weight. The result is the adjusted weaning weight for age.

Example

Weaning weight at 75 days is 80 lb

Birth weight is 9 lb

$80 \text{ lb} - 9 \text{ lb} = 71 \text{ lb}$ gain from birth to weaning

$71 \text{ lb} \div 75 \text{ days} = 0.95 \text{ lb}$ gain per day

$0.95 \times 70 \text{ days} = 66.5 + 9 = 75.5 \text{ lb}$ adjusted weaning weight

2. Now, to adjust for the age of the dam, multiply the age-adjusted weaning weight (from Step 1) by the appropriate adjustment factor (see highlighted cell in Table 1).

Example

The lamb is a twin wether from a 4-year-old ewe and is being raised as a twin. Multiply 75.5 lb by 1.08, for an adjusted weaning weight of 81.5 lb.



Table 1. Recommended factors for adjusting weaning weight.*

Type of lamb	Age of dam (years)		
	2 or 3 to 6	over 6	1
Ewe lamb			
Single	1.00	1.08	1.13
Twin—raised as twin	1.19	1.29	1.38
Twin—raised as single	1.10	1.19	1.29
Triplet—raised as triplet	1.36	1.54	1.80
Triplet—raised as twin	1.27	1.38	1.51
Triplet—raised as single	1.18	1.28	1.40
Wether			
Single	0.98	1.05	1.10
Twin—raised as twin	1.08	1.26	1.33
Twin—raised as single	1.03	1.16	1.25
Triplet—raised as triplet	1.33	1.50	1.72
Triplet—raised as twin	1.24	1.35	1.45
Triplet—raised as single	1.15	1.25	1.36
Ram lamb			
Single	0.91	0.98	1.02
Twin—raised as twin	1.08	1.17	1.21
Twin—raised as single	1.00	1.08	1.15
Triplet—raised as triplet	1.23	1.38	1.53
Triplet—raised as twin	1.15	1.25	1.31
Triplet—raised as single	1.07	1.16	1.23

*All adjustment factors are relative to a basis of 1.00 for a single ewe lamb from a mature ewe.

Flock management

Selecting breeding sheep

There is no room for snap judgments when selecting breeding sheep. Next year's lamb crop depends on your choices now. Take the time and the gas to drive around and look at prospects. Always keep your improvement plan in mind; choose only rams and ewes that will move you toward your goal.

The ram contributes 80 to 90 percent of the genetic improvement to the flock. A good ram does not cost—it **pays**. An outstanding sire can't be purchased for market price, and you can't expect outstanding lambs from a scrub ram. Keep the following in mind as you look at prospects.

- Each new ram and ewe should have been born and raised as a twin from a highly productive ewe that has consistently produced and raised twins or triplets.
- Select rams and ewes for growth and rapid gain. They should have at least a 60-day adjusted weight of 55 lb.
- Ask for production records on the flock and performance information on individuals. Obtain as much information as you can on performance of the sire, the dam, and the flock of which they are a part—more than just placings and winnings at shows.
- Check ewes and rams for soundness in feet, legs, and mouth.
- Select sexually aggressive rams.
- Scrotal circumference is probably the best indicator of fertility. Average scrotal circumference at 5 to 7 months is 30 to 32 centimeters. Testicles should be well formed and well developed.
- If ewes have had lambs, check the udders for soundness. They should be soft and pliable and free of lumps.
- Because wool contributes to the income from a sheep enterprise, don't overlook it when making your choices. Select heavy shearing sheep that have a dense, uniform fleece free of dark fibers.

Managing rams

Purchase new rams well before the anticipated start of the breeding season. The following guidelines may help you improve your ram management.

- Do not turn a newly purchased ram in with ewes immediately upon arrival on the farm. Wait at least 2 to 3 weeks until he becomes accustomed to his new environment.
- Shear rams 6 to 8 weeks before the start of the breeding season.
- Measure scrotal circumference 2 months before the start of the breeding season and at the start of the breeding season. If the second measurement is 5 or more centimeters smaller than the first, the ram may be infertile.
- Keep the ram's feet trimmed. Check and trim feet at least 30 days prior to the start of the breeding season. A lame ram will not get the job done.
- Keep rams as cool as possible by providing shade or cool quarters.
- Maintain the rams in good condition, but do not allow them to become excessively fat. Poor nutrition can result in lower fertility and loss of vigor and aggressiveness.
- During breeding season, feed rams about 1 lb of grain per day. If rams are thin going into breeding, increase the grain to 1.5 lb.
- Keep rams separate from ewes except during the breeding season.
- Use one yearling ram or mature ram per 35 ewes. A well-grown ram lamb should not be used on more than 25 ewes.
- If the weather is hot during the breeding season, turn the rams in with the ewes at night and keep them in cool quarters during the day. This allows you to provide supplemental feed if necessary.

You can raise ram efficiency by using a rotation system or by hand breeding. For a rotational system, rotate the rams every

24 hours. Place one ram or group of rams with the ewes for one day (or night). Replace rams with another ram or group while you rest and feed the first ones. Two aggressive rams can be used on 100 ewes.

For hand breeding, place the ewe in heat with the ram for breeding one time and then remove her. Repeat twice in 24 hours while the ewe is still in heat. A vigorous, well-cared-for ram may breed about five ewes per day on this system.

Consider using a marking system to check ram performance and to determine when ewes are bred so that you can predict lambing dates. A marking system can consist of a harness containing a crayon. Another method is to mix a coloring

material with oil or grease and apply a small amount each day to the brisket of the ram. Change the color every 17 days, using the lightest colors first.

If you do not use a marking system, record the date rams were turned in with the ewes so that you will know when to expect the first lambs.

Determine how long a breeding season you want and remove the rams at the end of this time. A 34-day breeding season allows all ewes to return to heat if they don't conceive. Some have the opportunity to cycle three times. A longer breeding season tends to string out the lambing season, thus making management of lambs more difficult.



Table 2. Suggested daily rations for ewes (late pregnancy).

	Ewe weight ¹	
	155 lb	175 lb
	Rations ² (lb)	
Ration 1		
Alfalfa hay (≥ 15% CP ³)	4.00	4.20
Corn	1.00	1.00
Ration 2		
Grass hay (10% CP)	4.00	4.20
Corn	1.00	1.00
Soybean meal	0.10	0.10

¹Weight at breeding time (average condition).

²Amounts listed are on an "as-fed" basis.

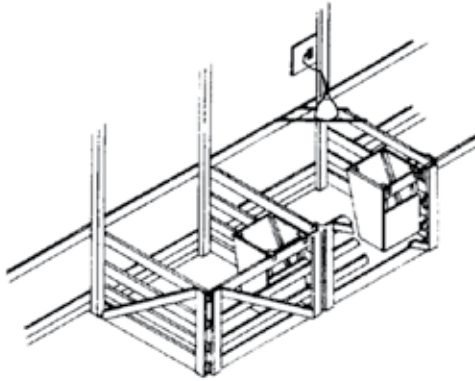
³CP = crude protein

Managing ewes

During breeding

- Trim feet 30 days before the start of breeding. Treat ewes for internal parasites at this time (see "Health management: Parasites," page 15).
- Ewes should not be fat at the beginning of the breeding season. Have them in moderate condition.
- Flush ewes, starting 2 weeks before breeding and continuing through the breeding season. Improving condition through flushing may increase the lambing percentage by 10 to 20 percent. Flush ewes by placing them on a rested or better quality pasture or by feeding 0.5 to 0.75 lb of grain (corn, oats, or barley) per day. If flushing on pasture, use a grass or mixed pasture. Grazing ewes only on legumes during the breeding season may delay conception.
- To stimulate estrus and group lambing, try using a teaser ram. Introduce him to the ewe flock about 15 to 17 days before the date you want to start the breeding season.

Lambing pen.
Drawing from
"40 Ewe
Lambing Shed,"
MWPS 72509.
1979. Midwest
Plan Service,
Ames, IA.



A creep
feeding
area
set-up.

- Record breeding dates if using a marking system. Alternatively, record when rams are placed with the ewes, so you will know when to expect the first lamb.

During gestation

Inadequate nutrition during gestation may result in:

- Pregnancy disease (ketosis)
- Weak lambs at birth
- Increased lamb mortality
- Decreased lamb birth weights
- Lower milk production
- Slower lamb gains

It is especially important that ewes continue to gain slightly for about 3 weeks after conception, because proper nutrition during this time will reduce embryo mortality.

The nutritional requirements of the ewe flock for the next 15 weeks of gestation are mostly for maintenance. Grazing good pasture will meet the ewes' needs.

The last 4 to 6 weeks of the gestation period are critical. Ewes should gain from 20 to 30 lb during gestation, with most of the gain taking place the last 4 to 6 weeks. The fetus makes about 70 percent of its growth during this period. During the final 4 to 6 weeks, start feeding about 0.25 lb grain per day until the recommended amount is being fed (Table 2). Save and use your best quality roughage for this period.

During this time, the fetus may begin to crowd the digestive system of the ewe so that she is unable to consume large amounts of roughage. Add concentrates to meet her increased nutritional needs.

Other considerations during gestation include:

- Provide a mineral-salt mixture free choice. Use either iodized salt or trace mineral salt mixed with a calcium-phosphorus source such as dicalcium phosphate.
- Provide sufficient feeder space for every ewe. Crowding and injury to the ewes kills lambs.
- Avoid narrow gates or high sills that ewes must jump over.

If adequate shelter is available, shear ewes 2 to 3 weeks before lambing. A shorn ewe is more sensitive to the needs of a baby lamb, the lambs will nurse more easily, and the ewes require less barn space. If you don't shear, crutch the ewes before lambing. Crutching means to shear around the dock, flanks, udder, and about 6 inches of the belly in front of the udder.

During lambing

Prepare the lambing quarters at least 1 week before you expect the first lambs to be born. Although the average gestation period is 148 days, some ewes are unaware of this fact and may lamb a week early!

Clean and freshly bed the lambing quarters. Make certain the area is free of drafts. Assemble lambing pens or jugs. A

good guideline is to have one lambing pen for each 10 ewes.

Research at the University of Illinois Experiment Station at Dixon Springs shows promise in the use of lambing cubicles. Cubicles reduce mismothering and lamb stealing and decrease separation of ewes and lambs in the case of multiple births. Cubicles are 4 x 6 feet, with a 2-foot-wide entry and a 10-inch-high threshold to keep the lambs inside. Put the cubicles in the pens where you keep the ewes closest to lambing. Place them in the corners farthest from the shepherd's work area. If you know the favorite lambing sites in your barn, put the cubicles there.

Time spent with the ewes at lambing is worthwhile because it increases the number of lambs saved. Separate close-up ewes from the rest of the flock. Watch ewes closely and be prepared to assist if necessary.

If a ewe has been in labor for more than 1 hour without making any progress, she should be examined. Thoroughly wash your hands and arms and proceed gently. Do not rush; be patient (see "Lambing difficulties," page 12).

After lambs are born, place the ewe and lambs in the lambing pen and do the following.

- **Strip** the ewe's teats to remove the wax plug. Make sure the teat canal is open and look to be sure the colostrum is there.
- **Clip** the lamb's navel (umbilical) cord to about 1.5 inch long.
- **Dip** the navel cord in 7-percent tincture of iodine.

Make sure each lamb nurses. Colostrum helps the lamb fight disease, so it is important that lambs receive colostrum shortly after birth.

If a lamb is too weak to nurse, use a stomach tube to give it its first colostrum. Either strip out enough colostrum from

the mother or, if the mother is short of milk, use colostrum from another ewe that has just lambed.

It is a good idea to have a supply of colostrum on hand. Obtain colostrum from ewes that have lost their lambs or have delivered dead lambs. Freeze it in an ice cube tray for emergencies. When thawing frozen colostrum, do not overheat; heat destroys the proteins that help the lamb gain disease resistance.

Provide supplemental heat (heat lamps) if it is very cold. Don't overuse heat lamps. You want only to get the lamb dry and off to a good start.

After lambing, give the ewe fresh water and a small amount of hay in the jugs. Do not feed grain the first day. After the first day, feed a small amount of grain along with the hay. Take a week to return the ewes to their recommended level of feed.

Identify lambs with an ear tag, ear notch, or tattoo, and record lambing information. Keep the ewe and lambs in their lambing pen approximately 1 or 2 days so that the ewe is certain to claim her lambs and so that they become acquainted. If pressed for room, leave singles in the pens for a shorter period.

After taking the new families from the lambing pens, combine them into small groups of 6 to 10 ewes with their lambs for a few days before forming larger



Table 3. Lactation rations (first 8 weeks of lactation).¹

Ration	Nursing twins		Nursing singles	
	155-lb ewe	175-lb ewe	155-lb ewe	175-lb ewe
Ration 1				
Alfalfa hay (≥ 15% CP ²)	4.75	5.00	4.75	5.00
Corn	2.00	2.25	1.5	1.5
Ration 2				
Legume—grass hay (12.5% CP)	4.75	5.00	4.75	5.00
Corn	1.65	1.90	1.40	1.40
Soybean meal	0.40	0.40	0.10	0.10
Ration 3				
Grass hay (10% CP)	4.75	5.00	4.75	5.00
Corn	1.30	1.50	1.15	1.15
Soybean meal	0.75	0.75	0.40	0.40

¹Amounts are in pounds, on an “as-fed” basis.

²CP = crude protein

Table 4. Some suggested creep rations with hay fed free choice.

Ingredient	Composition of ration (%) [*]		
	Ration 1	Ration 2	Ration 3
Corn	79.5	41.5	41.5
Oats	—	41.0	—
Barley	—	—	41.0
Soybean meal	20.5	17.5	17.5

^{*}Assuming that a salt–mineral mixture is fed free choice.

groups. This is especially important for ewes with multiple births.

Separate ewes with multiple births from ewes with singles. This arrangement will allow you to feed according to requirements.

During lactation

Ewes reach peak milk production 4 weeks after lambing, and milk production then begins to decrease.

Ewes nursing twins require more protein and energy than ewes nursing singles. Table 3 shows suggested rations for ewes nursing twins or singles. These rations are merely suggestions; other feedstuffs may

be substituted, depending on availability. The exact amount to feed depends on the weight and condition of the ewe. If you select a lambing date that coincides with spring pasture availability, pasture alone may be sufficient for lactation. However, keep in mind that there must be a sufficient quantity available, and it must be of high quality to support maximum milk production.

After the first 60 days of lactation, reduce the amount of feed to that fed during late gestation. Because milk production is declining at this time, feeding more will fatten the ewe—very costly feed for what you get back.

One week before weaning the lambs, reduce roughage levels and omit the grain portion of the ration.

The day of weaning, withhold feed but provide water. This helps stop milk production. For the next several days, until ewes are dry, feed about 2 to 3 lb of poor-quality hay. This schedule reduces milk flow and potential problems with mastitis. Do not put the ewes on pasture immediately after weaning.

To reduce stress to the lambs at weaning, it is best to remove the ewes, leaving the lambs in familiar surroundings. Take the ewes out of sight and sound to reduce the pain of parting.

Lamb management and nutrition

Lamb survival and performance will determine, to a large extent, the profitability of the sheep enterprise. Lamb mortality is estimated to be 15 to 20 percent from birth to weaning, with 75 percent of the losses occurring in the first 2 weeks.

Birth to weaning

The following steps are key to getting lambs off to a good start.

- Dip the lamb's navel cord at birth in a 7-percent iodine solution.
- Make sure all lambs receive an adequate intake of colostrum within a few hours of birth.
- Eliminate possible "booby traps" that might injure or kill lambs. These hazards include:
 - Loose gates or unsecured panels that might fall on the lambs
 - Openings or places where lambs can stick their heads and be choked or get a leg caught and broken
 - Loose string or wire that might entangle a lamb
 - Open water tanks where lambs might drown
- Dock and castrate lambs when 3 to 7 days old. Cut tails 1.5 inches from the body.
- Vaccinate lambs against overeating disease (enterotoxemia); see page 16.

Creep feeding In the case of early lambs (January through March), start creep feeding at 1 week of age to provide supplemental feed during the nursing period. You might not need to creep feed late lambs, since they can use the pasture that is available.



Location of the creep area is important. It should be in a dry, well bedded, and protected area close to the brood ewes. A light or heat lamp may be used at first to coax the lambs into the creep. Provide clean, fresh water close by.

Provide several openings into the creep so all lambs can get in. A 12- by 12-inch opening keeps ewes out. If the lambs eat well, you might have to enlarge the openings later.

Keep creep feeders clean. Until the lambs start eating well, remove uneaten food daily and give it to the ewes.

Initially, the creep ration should contain 18 to 20 percent crude protein. A mixture of 50 percent soybean meal and 50 percent rolled oats or corn is a good starter creep feed. Its taste is appealing to young lambs.

Once the lambs are eating well, decrease protein to 16 percent. To decrease the protein content of the ration approximately 1 percent, replace 3 lb of soybean meal with 3 lb of corn in each 100 lb of ration, or replace 60 lb of soybean meal with 60 lb of corn in a ton of ration (Table 4).

Until lambs are 6 weeks old, feed grain that is coarsely cracked, rolled, or crimped. After 6 weeks, grain may be fed whole.

If you want to formulate your own creep ration, keep in mind that **creep rations do not have to be complex to be good**. See Table 4 for suggested rations.

Weaning

The age of weaning depends on your management system. Three months after lambing, most ewes are milking very little and the lambs' nutritional needs must be met by supplemental feed. It usually is most economical to wean at this age. Early lambs probably should be weaned earlier, at about 70 days of age.

At weaning, remove the ewes from the lambs. There is less trauma if the ewes and lambs are separated, and the lambs will experience little or no loss in performance.

If lambs are not weaned before pasture is ready, you might want to consider doing one of the following.

- Keep ewes and lambs in a drylot at night. Place ewes on pasture during the day, while lambs remain in the drylot on creeps.
- Keep ewes and lambs in a drylot during the day. Put ewes on pasture during the night, while creeping lambs.

In either case, lambs do not go to pasture with the ewes.

Weaning to market

Continue feeding the creep ration until lambs reach 85 to 90 lb. At that time, you can decrease the protein content to 13 or 14 percent.

Use high-quality feeds, and do not change rations rapidly. Gradually blend the new ration with the old, increasing the proportion of new to old until the change is complete.

Lambing difficulties

Being on hand at lambing, experienced sheepmen say, is about your most important job of the year. There is plenty to keep one operator busy, particularly if weather is wet or cold. Due to lamb size, pelvic size of the ewe, or improper position of the lamb or lambs, ewes often need help at lambing. If a ewe has trouble,



you need to understand the mechanics of lamb delivery. Failure to act promptly will result in a dead lamb at delivery. It also can result in losing the ewe.

When to help

Knowing when to help the ewe is probably the most important factor in saving lambs. Examine the ewe if:

- She has been in the first stage of labor for 2 to 3 hours and doesn't start actively straining. In the first stage of labor the cervix dilates, during which time the ewe will be somewhat uneasy.
- She has been in the second stage of labor for 30 minutes to an hour with little progress. The second stage of labor occurs when the head or feet enter the vagina, which stimulates straining to expel the lamb.
- The water sac or membranes have been evident for 30 minutes to an hour with little progress.

Examination procedure

1. Confine and restrain the ewe so she can't get away.
2. Be clean. Wash the rectal-vaginal area of the ewe and your hands and arms.
3. Put on a disposable plastic sleeve; it's better to use than your bare hand.
4. Lubricate your sleeved hand and arm with a suitable lubricant. Use an obstetrical lubricant rather than soap.

5. Enter the vagina, keeping your fingers close together so you don't puncture the reproductive tract. Identify the cervix and the extent of its dilation; then determine the presentation and posture of the lamb as well as its size.

Identifying presentation and posture

Presentation refers to whether the lamb is coming forward or backward. Both of these are normal. Do **not** turn a lamb around just because it is coming backward.

Posture refers to placement of the head and feet. In a forward presentation, the normal posture is for both front feet and the head to be in a "diving" position. In the backward presentation, the normal posture is for both hind feet to be together.

Abnormal postures may include:

- Lamb backward with the rear legs tucked under the lamb
- Lamb in frontal position with one or both legs back or head tucked back
- Lamb on its back (upside down)
- Two lambs presented at one time
- Lamb at right angle to the pelvis with the side or back against the birth canal

When determining posture, first locate the head, if possible. If you can find only legs, determine whether they are front legs or rear legs. (Feel along the lamb's leg, joint for joint, while looking at the ewe's legs for comparison.) Be sure the legs you locate belong to only one lamb.

Correct deviations from the normal posture before attempting to pull the lamb.

How to help

Leg or head is back If one or both legs or the head is back, push the lamb back into the uterus between contractions, and manipulate the body part into proper position. Be careful when pushing the lamb so that you don't tear the uterus.

Head and front legs are in normal position, but front legs are locked against pelvis Pull steadily on one leg at a time to straighten the forelegs and make delivery possible.

Only tail is presented Push the lamb back into the uterus between contractions, grasp the rear legs, and deliver the lamb. When pulling a lamb by its hind feet, take care; the rib cage may lock on the pelvis of the ewe. Any jerking can cause rib and internal damage. To avoid this problem, swing the legs from side to side while pulling the lamb.

Lamb is on its back (upside down) Rotate the lamb to a normal position before delivery is attempted.

Lamb is presented at right angle to the pelvis (side or back against interior opening of birth canal) Push the lamb back into the uterus, rotate the lamb to normal position, then complete delivery.

Two lambs (twins) are presented at same time Determine which lamb can be delivered with the least effort. Gently push the other lamb back and deliver the first. The second lamb also should be delivered, as it is unlikely to be in the proper position.

If assistance is needed, obstetrical chains, a lamb puller, or a smooth plastic-coated wire may prove helpful in correcting the position of the lamb, providing traction, or guiding the animal through the birth canal.

Assistance after birth

Anytime it is necessary to help in delivery, examine the ewe for a second or third lamb.

After a lamb is delivered, make certain that mucus and membranes are removed from its head. Make sure the lamb is breathing. Applying gentle pressure to the ribs, tickling the nostrils with a piece of straw, or blowing into the mouth may stimulate breathing.

Learn from each experience. If you are not sure what happened, ask your veterinarian for advice. The best thing, of course, is to have the vet on hand.

Artificial rearing of lambs

Extra or orphaned lambs occur in nearly every flock. If a ewe has three lambs (in any combination of adopted or natural), leave the two closest in size to each other with the ewe and remove the odd one, whether it is the largest or smallest. Transfer extra lambs to another ewe whenever possible. A lamb fostering or claiming pen equipped with a stanchion is helpful.

Lambs not grafted to another ewe can be raised on milk replacer. With multiple births, the weakest lamb usually is selected for artificial rearing on milk replacer, because it is less capable of competing at the udder.

It is important that all lambs receive colostrum. If none is available from the mother or another ewe, use colostrum from goats or cows. Having a supply of frozen colostrum available is recommended.

Thaw frozen colostrum and feed it at room temperature. Be careful when thawing; heat destroys the antibodies—which are the reason for feeding colostrum.

After lambs have received three feedings of colostrum during the first 12 to 18 hours of life, wait about 4 to 5 hours before starting them on liquid milk replacer.

Using milk replacer

Place lambs to be raised on milk replacer in a draft-free, well-ventilated area. Use a heat lamp to provide supplemental heat until the lambs are nursing well. A slotted or wire mesh floor may be the easiest way to keep the area clean and dry.

Use a milk replacer designed for lambs and follow the manufacturer's directions. It should contain 30 to 32 percent fat, 22 to 24 percent protein, and 22 to 25 percent lactose (dry matter basis).

Use either warm or cold milk replacer to train lambs to suckle on self-feeders. It is best to start lambs on replacer of the same temperature you plan to use throughout the feeding period; there is a risk of rejection if you change temperatures. If you feed milk replacer free choice, use it cold to prevent overconsumption at a single feeding.

A trained lamb among the new orphans will help them learn to nurse. Assist the new crop every 6 hours until all are trained.

Once started on self-feeders, lambs will consume 1 to 2 quarts of milk replacer daily. This is equivalent to 0.5 to 1 lb of dry milk replacer.

Offer creep feed to lambs once they are started on the milk replacer. The feed should be very palatable and be about 20 percent crude protein (see page 11).

Wean at 4 to 5 weeks of age; feeding milk replacer any longer is costly. Before weaning, make sure lambs are eating some solid food. Research at the U.S. Sheep Experiment Station at Dubois, ID, indicates that weaning lambs abruptly from milk at 4 to 5 weeks works better than offering a diluted milk replacer the final week.

Vaccinate all artificially reared lambs early for enterotoxemia (shortly after starting on milk replacer). Lambs that do not receive colostrum should be vaccinated immediately with clostridium Type C and D antitoxin.

Health management: Parasites

Parasites, both external and internal, cause thousands of dollars in losses to the sheep industry each year. A good control program is essential.

External parasites

Sheep keds (ticks), lice, and mites can impair the performance of sheep of all ages. The animals become unthrifty. They rub and scratch because of the irritation, damaging their wool. The parasites also directly damage wool fibers. Ked infestations also decrease the value of pelts.

Sprays, dusts, and pour-ons have largely replaced dips for external parasite control. Use preparations approved and recommended for sheep. Check with your veterinarian or county Extension agent for the latest approved pesticides.

Internal parasites

Every sheep and lamb that has been on pasture is infested with internal parasites, no matter how “clean” your operation seems to be. You cannot control parasites by indiscriminate use of drugs alone; you must develop a control program and practice it religiously. Do not wait until symptoms appear before acting.

Contamination of pasture is continuous, so develop a grazing system to break the life cycle of the parasite. Be sure to observe the following practices.

- Use clean, rested pasture for lambs. Lamb are more susceptible to parasites than older sheep.
- Keep sheep away from low, wet areas. Prevent leakage of water around tanks and troughs.
- Do not feed sheep on the ground. Use feed bunks.

Strategic treatments, planned to prevent buildup of parasites at critical times, are a very important part of a good control

Herd health program checklist

The following herd health management program is a guideline.

Sixty days before breeding

- Deworm rams.

Thirty days before breeding

- Vaccinate breeding ewes against Campylobacteriosis (vibrio) and chlamydia (enzootic abortion), if problems are present.
- Deworm ewes.

Sixty to 90 days after the start of breeding

- Give a second vaccination (booster) against Campylobacteriosis (vibrio) to replacement ewes.

Thirty days before lambing

- Vaccinate pregnant ewes with clostridium C and D toxoid and tetanus toxoid.
- Deworm ewes.

Lambing time

- Make sure lambs nurse and receive colostrum.
- Vaccinate lambs for soremouth (if a problem).

Thirty days after lambing

- Vaccinate lambs with clostridium C and D toxoid.
- Give booster shot of clostridium C and D 2 to 4 weeks later.

Three weeks after start of grazing

- Deworm ewes, rams, and lambs.

During grazing season

- Deworm as needed for the remainder of the grazing season. Frequency will depend on levels of infestation.

program. Examples include treatment before turning sheep on pasture, just before rotating to another pasture, or following unseasonably rainy or humid weather during warm periods.

Minimal internal parasite control strategies

Prelambing treatment Treatment before lambing is key to preventing a potentially damaging rise in parasite egg counts. It is essential to use a dewormer that is effective against both “arrested” (inactive) larvae and mature forms.

Treatment in spring The advantage of treatment in spring is that it reduces the risk of a summer buildup of infection in pastures. Monitor young livestock; when you find the first parasite eggs, administer the first deworming treatment. Treat again 25 to 70 days later, depending on pasture contamination, management goals, and economic constraints. In some cases, a third or fourth treatment is required for efficient growth in young stock.

Treat and move strategy You can extend the effectiveness of a single treatment by moving animals to a less contaminated pasture to limit reinfection. If left on the same pasture, sheep will be reinfected almost immediately.

Health management: Disease prevention

The goal of every shepherd should be to maintain a healthy sheep flock and minimize the incidence of disease. This goal cannot be attained by the use of a needle, a bottle of antibiotic, and vaccines alone. You must combine superior nutrition, timely management, and appropriate health practices into a total preventive program. Talk to your veterinarian about prevention before you need to call for a diagnosis.

Health management: Diseases and abortions

Diseases

This section discusses some common sheep diseases. However, many more diseases can affect sheep. If you suspect that your sheep have any of these diseases, *immediately* seek veterinary attention.

Pneumonia

Pneumonia is a common problem in lambs. It may be caused by specific bacteria or by a combination of viruses and bacteria. Symptoms include fever, rapid

breathing, coughing, and discharge from the eyes and nostrils. Treatment involves identifying the causative agent and administering the proper antibiotic.

Stress conditions due to high humidity, drafts, insufficient colostrum, overcrowding, and unsanitary conditions in the lambing facility predispose animals to pneumonia. **Prevention** is the key. Remove stress factors by ensuring the lambing barn is properly ventilated and free of drafts, thoroughly cleaned before lambing, and kept clean throughout the lambing season.

Other control measures include shearing ewes before lambing, adding sulfa drugs to the ewes' water, or using antibiotics in the ewes' feed prior to and after lambing until weaning.

Lamb scours

Scours may be caused by noninfectious or infectious agents. Humidity, nursing dirty udders, overcrowding, deep and wet manure pack, and inadequate or late colostrum intake are some of the noninfectious causes. Infectious causes may be bacterial or viral. Lamb scours often results in pneumonia.

Take steps to prevent scours. Provide clean, dry, well-bedded pens, and make sure lambs get an early, adequate intake of colostrum. Provide adequate nutrition to pregnant ewes.

Scours leads to dehydration of the lamb, causing death if untreated. A dehydrated lamb needs electrolytes. Use a commercially available electrolyte solution. Give 8 to 16 ounces of the electrolyte solution (adjusting the dose to the lamb's size) at least three times daily.

Enterotoxemia (overeating diseases)

Enterotoxemia is caused by toxins produced by *Clostridium perfringens* types C and D.

Type C (hemorrhagic enterotoxemia) is a disease of lambs less than 10 days old.

The toxins destroy the lining of the gut wall. Affected lambs may die unexpectedly with no symptoms. Postmortem exams reveal lesions of the intestinal tract.

Type D enterotoxemia (pulpy kidney) causes sudden death in lambs, usually those over 30 days of age. Symptoms may include head pressing, grinding of teeth, staggering, and convulsions. Generally, affected animals are found dead.

Treatment is not feasible for Type C and rarely is effective for Type D. Thus, preventive measures are your best weapon. Vaccinate pregnant ewes with Type C and D during the last 30 days of pregnancy. The resulting high levels of antibody in the colostrum should protect the lambs. Vaccinate lambs with Type D toxoid at 30 days of age, and follow up with a booster in 2 to 4 weeks.

Contagious ecthyma (soremouth)

Soremouth is caused by a pox virus that affects primarily the lips of sheep and lambs. It causes pustules and thick crusts or scabs on the lips and mouth. The greatest damage occurs when the lamb transfers the infection to the udder and teats of a ewe.

Soremouth is painful to both lamb and ewe. The sores on the mouth of the lamb prevent it from nursing. The ewe, with sores on the teats and udder, will not allow the lamb to nurse. In addition, the infected ewe will develop mastitis. Lambs seldom die from soremouth, but they do become unthrifty due to lack of food. Recovery generally occurs in 2 to 3 weeks.

Prevention is best accomplished by using a commercially available live vaccine. Once sheep have the disease, little can be done in the way of treatment. Antibiotic ointments can, however, keep the scabs soft and free from secondary bacterial infections.

The soremouth virus on infected lambs and the live, nonattenuated vaccine can infect humans. Use extreme care and wear



rubber gloves when working with infected sheep or using the vaccine.

Pregnancy disease or toxemia (ketosis)

This is a metabolic disease of pregnant ewes that occurs during the last 6 weeks of pregnancy. It is caused by the rapid growth of the fetus and decreased room in the ewe's digestive tract. Affected ewes become sluggish and have decreased appetite. In the later stages they seem blind, stagger, and grind their teeth.

Treatment is effective if initiated in the very early stages. Use an oral drench of propylene glycol.

Prevent pregnancy disease by supplying adequate levels of energy to ewes during the final 4 to 6 weeks of pregnancy. Generally, supplementation with grain or other concentrate feedstuffs is needed.

Avoid stress, sudden changes of feed, or other activities that will alter feed requirements during the final 4 to 6 weeks of gestation.

White muscle or stiff lamb disease

This disease is caused by a combined deficiency of selenium and Vitamin E. It is a degenerative disease of the skeletal and cardiac muscles. Lambs exhibit stiffness and rapid breathing. Sudden death may occur due to heart failure. Because

Foot rot control checklist

The following program will help control foot rot.

- Keeping hooves trimmed is 90 percent of treatment and control. Trim the feet of all sheep and run them through a footbath. An effective footbath solution includes zinc sulfate, 10 percent solution (8 lb zinc sulfate to 10 gal of water). Research indicates that zinc sulfate is more effective than formalin or copper sulfate.
- Isolate affected animals to a hospital group.
- Inspect affected sheep every 2 weeks.
- Place recovered sheep in a convalescent group.
- Return convalescent sheep to the clean group only after they pass two clean inspections 30 days apart and are treated at the time of each inspection. Treat sheep by running them through a footbath solution or applying a topical solution of 10-percent zinc sulfate to each foot. Use a hand aerosol sprayer.
- Continue treating the infected group every 2 weeks. Cull sheep that do not respond to treatment after 6 weeks.

symptoms can resemble those of other diseases, an autopsy is needed to determine the cause of death.

Prevention is effective. Do one of the following.

- Supplement feeds with a selenium source. Use a supplement formulated for sheep.
- Inject lambs with a selenium+Vitamin E source at birth and again 30 days later. Injecting ewes with a selenium+Vitamin E source 3 to 6 weeks before lambing provides satisfactory levels to unborn lambs and, for newborns, in the colostrum. However, it is better to have the flock on a trace-mineral supplement to make certain that lambs are not deficient in selenium. If the ewes are on a trace-mineral+selenium supplement, injecting the lambs at birth generally is not necessary.

Abortions

Several infectious organisms cause abortions. Other causes include hormonal imbalance, poor nutrition, toxins, noxious weeds, and physical injury.

Campylobacteriosis (Vibriosis)

Vibriosis is caused by bacteria. Infected ewes often abort in the last 3 to 4 weeks of pregnancy, or lambs born at term are dead or weak (usually dying within 24 to 48 hours).

Ewes contract the disease through the mouth, so it is important to remove aborted fetuses and all placental material promptly. If you can identify the ewe that aborted, isolate her from the flock.

You must act before the problem appears in your flock. A vaccine is available; when given annually, it can help prevent abortions due to vibriosis. Treatment is not very effective, but high levels of antibiotics may reduce losses.

Enzootic abortions (chlamydial abortion)

Ewes abort in the final 3 to 4 weeks of pregnancy. A positive lab diagnosis is essential to differentiate enzootic abortions from vibriosis.

Prevent abortions; a vaccine is available. Antibiotics can be used during an outbreak. However, by the time the disease is under control, losses can be quite high.

Toxoplasmosis

Toxoplasmosis is caused by a protozoan parasite. Cats are known to spread the disease, so keep them away from sheep. Do not allow cats to defecate in feedstuffs for sheep, as this is a primary means of infection. Total control means removing the source of infection—the cats—but that may not be desirable. The disease is not transmitted from sheep to sheep.

Foot care

- Trim the feet of all sheep at least twice a year.
- Isolate all new sheep brought into your flock.
- Avoid making sheep travel through deep mud or manure.

- When you notice a lame sheep, examine its feet.
- Isolate all sheep with any type of foot infection to avoid pasture contamination.
- Sell lame sheep that do not respond to treatment.
- Place and properly pack fleeces in the appropriate wool bag.
- Store fleece in a cool, dry, dust-free place.

Foot rot

Foot rot is a highly contagious disease that can force you out of the sheep business if you don't control it. It is caused by a bacterial organism that invades the horny hoof and spreads throughout the horny tissue, resulting in lameness. The disease is characterized by a foul-smelling discharge from the infected hoof.

The organism causing foot rot requires an oxygen-deficient place for growth. Overgrown hooves in wet, muddy areas are an excellent environment.

Wool management

Wool is part of your total income from sheep. In many cases, however, it is the most poorly managed part of the operation. A good wool clip is grown carefully throughout the year and is shorn and prepared for market with utmost care.

You can improve the quality and volume of wool through selection of ewes and rams. Select for uniformity in grade, length of staple, density, and freedom from black and hairy fibers.

A well-grown wool clip can be ruined easily at shearing. Follow these suggestions.

- Shear only when fleeces are dry.
- Keep the shearing floor clean.
- Remove straw and hay from the belly of the sheep before shearing.
- Remove tags, dung locks, and stained wool; bag them with the floor sweepings.
- Remove excess chaff in the head and neck wool.
- Shear all black-face sheep last. Bag their wool separately.

Be very selective in hiring a sheep shearer. He or she should be able to remove the fleece in one piece with a minimum of second cuts and skin cuts. The shearer should handle the sheep carefully, especially pregnant ewes close to lambing.

After shearing, visit your local Farm Service Agency (FSA) office to apply for your loan deficiency payment on your wool. It is important to complete this application before losing beneficial interest or selling your wool.



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