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MANAGING EWES FOR MORE LAMBS

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Introduction

Studies have clearly demonstrated that the best way to increase profitability in the sheep business is to increase the number of lambs born per lambing. It is then obvious the more of these additional lambs that survive to market weight, and the more quickly they reach that weight, the more profitable they will be, in most cases. This presentation will be limited to the first two of these three important factors affecting sheep production profitability.

There are a number of things which influence the flock lambing or twinning rate. These include: hereditary tendency for twinning; hybrid vigor; percentage of the flock which lamb at each lambing time; ability of replacement ewe lambs to lamb at one year of age; season of the the year and ambient temperature when ewes are bred; lambing or breeding interval; age of the ewe; nutrition level and body condition of the ewe; semen quality, sex drive, and copulating ability of the ram; and the relative freedom of the ewes from disease, especially those causing immature birth or weak lambs. Factors affecting lambing frequency include: hereditary tendency for long breeding season, postpartum interval, season of lambing, early weaning of lambs, and nutrition level of the ewe.

Survival rate is influenced by: 1) mothering ability of the ewe including lactating ability which is influenced mostly by age of the ewe and nutrition, 2) freedom from disease and parasites, 3) protection from adverse weather, accidents, and predators, and 4) balanced nutritious diet.

Flock Lambing Rate

Heredity: With the importation of the highly prolific Finnsheep, cross-breeding, selection, and new breed development which have followed, it is now possible to design a flock which will produce the lambing percentage which one wants to optimize production in relation to the farm or ranch environment, whether it be 1, 2, or 3 lambs per ewe per lambing (Table 1). In most circumstances, two lambs per ewe per lambing and one lambing per year will be the optimum production rate. However, some highly intensive operations might do better with 2.5 or 3 lambs per ewe per lambing. Other flock owners may also benefit by lambing at intervals of less than a year. On the other hand, some extensive operations with poor arid range can successfully raise only single lambs at yearly intervals.

Table 1. Possible breed types to achieve varying flock lambing rates.

1.0 lambs	1.5 lambs	2.0 lambs	2.5 lambs	3.0 lambs	3.5 lambs (accelerated)
Rambouillet	Rambouillet[1/]	1/4 Finn, 3/4 other	1/2 Finn, 1/2 other	Finnsheep	Polypay
Merino	Targhee	Polypay	Polypay[1/]	Rominoff	Finnsheep
Romney	Columbia	Suffolk[1/]			
	Suffolk				
	Dorset				

[1/] Lines selected for prolificacy.

Table 1 is a generalization. It is recognized that there are highly selected flocks including many additional breeds which may fit under a number of different lambing percentage columns. Management can also make an

important impact within breed on the overall flock lambing rate. The season of year that ewes are bred and level of nutrition can influence lambing rate as well as fertility (Figure 1). Ovulation rate reached a peak in October, then declined seasonally until February except that a high level of nutrition delayed and minimized the delcine (treatment 5) or stimulated an increase (treatment 4) when the nutritional level was not optimal. Most of the ewes stopped ovulating and stopped showing heat in March.

Figure 1.

Fertility

The percentage of the flock which lambs at each lambing has an important impact on the overall lambing percentage (no. of lambs born/no. of ewes in the flock). If only 75% of the ewes in the flock lamb, even though they may each have twins, the flock lambing rate is only 150%. Therefore, it is important to manage the flock to get, as nearly as possible, 100% of the ewes to lamb.

A number of factors can reduce fertility. These include: 1) Lowly fertile or sterile rams, 2) poor nutrition, 3) disease, 4) parasites, 5) early or late season breeding when some ewes are not cycling, 6) high temperatures during breeding, 7) young underdeveloped ewes or old unthrifty ewes, 8) short

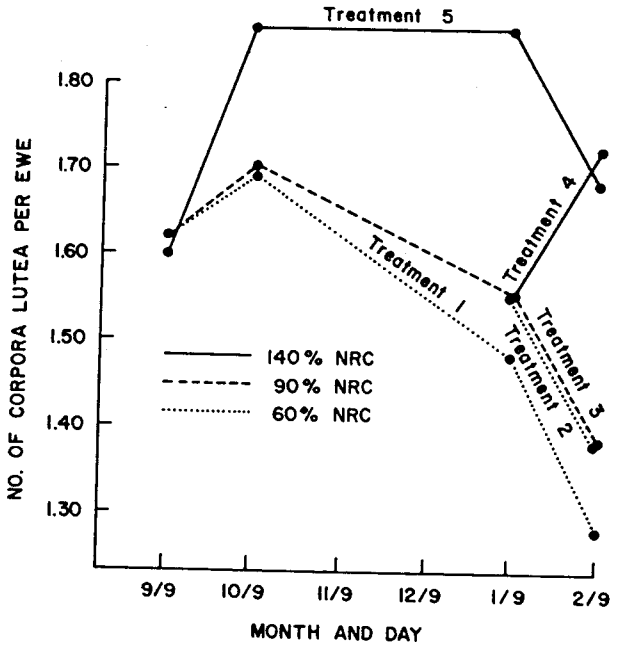

Figure 1 - Effects of level of feeding and change in season on ovulation rate (CL) in 1966 and 1967 combined.

lambing interval and, 9) sheep from low fertility flocks which may be highly inbred or have other genetic problems.

What can be done to get more lambs

First, make certain that your ewes are in good thrifty condition, not overly fat, but also not too thin. Cull old ewes that are declining in production but maintain a good proportion of the flock in the 4-6 year age group (see Table 2). Have them on good feed for at least two weeks before and

Table 2. Effect of age of dam on three lamb production traits.

Age of dam	No. of ewes bred	Fertility % of ewes lambing of ewes bred	Prolificacy % of lambs born of ewes lambing	Overall reproduction % of lambs weaned of ewes bred
2	732	87	126	83
3	647	91	131	98
4	515	93	137	112
5	427	92	143	105
6	288	90	145	110
7	190	94	141	105
8	109	90	145	93
9+	54	82	153	99

From Sidwell et al. (1962) U.S.D.A., Beltsville, Maryland.

during breeding. If ewes are on irrigated or intensive pastures in humid areas where internal parasites might be a problem, they should be treated with a good internal parasite medicine such as levamisole or thiabendazole, a short a short time before breeding.[1/]

1/ Names of products are included for the benefit of the reader and do not imply endorsement or preferential treatment by USDA.

Check the rams very carefully for overall soundness and trim hooves before putting them with the ewes. Semen testing by an experienced tester is desirable but frequently not possible. The criteria shown in Table 3 have been very useful in culling out the rams that are likely to be sterile or of low fertility as illustrated in Table 4. This example indicates that rams scoring

Table 3. Criteria for assigning scores to semen[1/] quality .

Semen Score	Quality	pH	Motility Score (5)	Concentration[2/]	% Live Normal	% Abnormal	% Abnormal Heads
1	Very good	6.6	1 (90)	1.8	90	10	0
2	Good	6.8	2 (75)	1.4	80	20	5
3	Satisfactory	7.0	3 (60)	1.0	70	30	10
4	Poor	7.4	5 (15)	0.1	40	60	25
5	Very poor	>7.4	6 (<15)	<0.1	<40	>60	>25

[1/] Semen can score no higher than its poorest characteristic.

[2/] Billions of sperm/cc.

Table 4. Relationship of semen score to ram fertility.

Semen Score	No. of Rams	% Ewes Settled of Ewes Bred[1/] 100-80	79-60	59-40	39-20	20
1	47	94	6	--	--	--
2	35	97	3	--	--	--
3	33	97	3	--	--	--
4	17	35	24	23	6	12
5	4	25	25	--	25	25

[1/] Percentage of rams is classified by percentage of settled ewes to which the rams were mated. For example, for semen score 1, 94% of the 47 rams settled 80-100% of the ewes with which they mated, and 6% of the 47 rams settled 60-79% of the ewes with which they mated.

4 or 5 should not be trusted to breed the ewes. There are a number of things which the flock owner who cannot semen test, can do to improve the chances that his rams are fertile. 1) Examine each testicle carefully. The testes should be large (at least 30 cm in circumference), firm, uniform in shape and size, and free from any lesions (lumps, knots, hard spots, or enlarged areas). Small, soft, flacid testes or testes with lesions usually are associated with low fertility. 2) If a semen sample is examined, it should have a good concentration of motile, normal sperm cells and should be relatively free from pus cells (see Figures 2 and 3). 3) Observe ram behavior after introduction to see

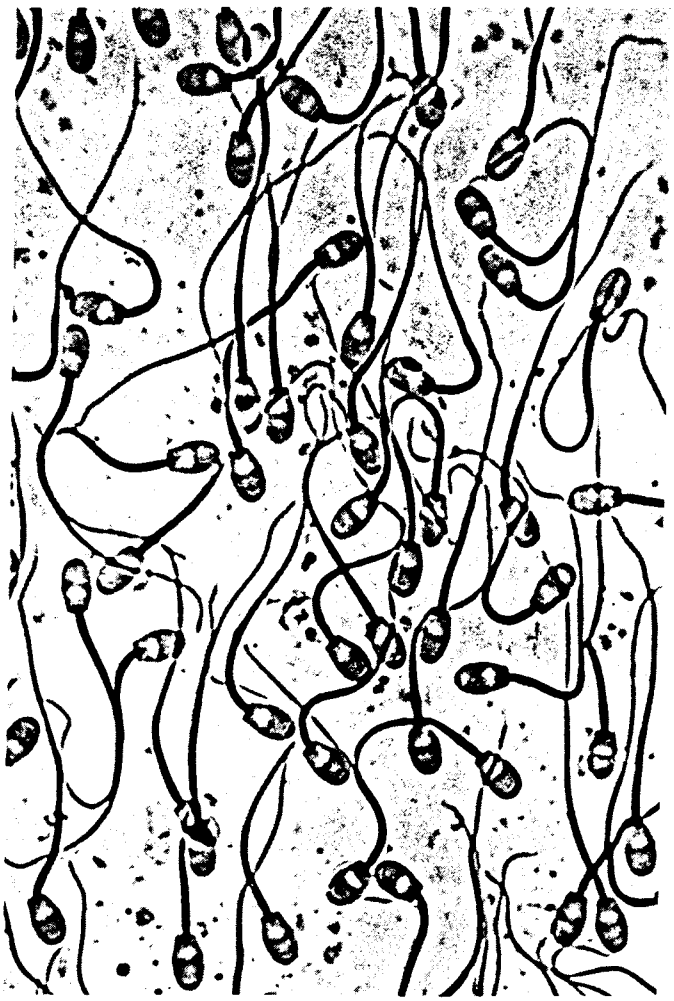

Figure 2 - Photomicrograph showing appearance of normal, high-quality semen which usually denotes a high degree of fertility.

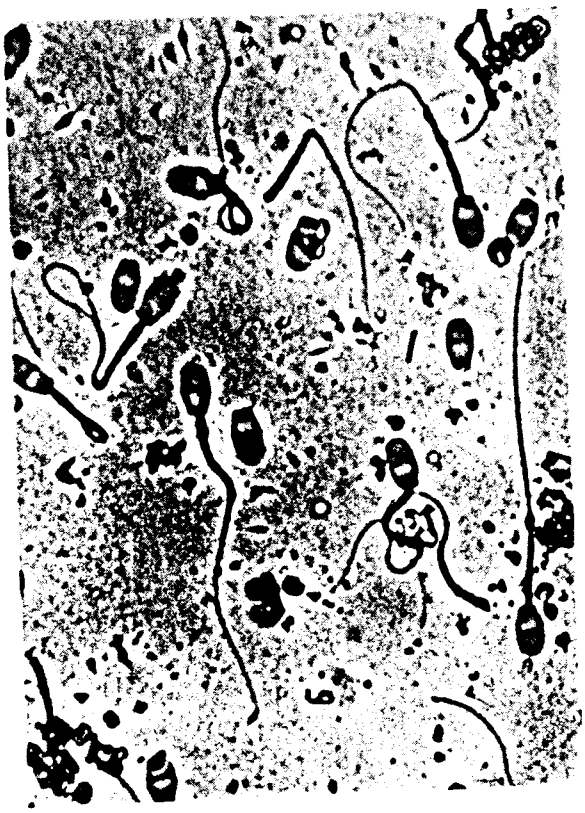

Figure 3 - Photomicrograph showing appearance of degenerative semen which usually indicates sterility or impaired fertility, at least for the immediate future.

that the ram(s) has adequate sex drive and copulates relatively easily with ewes in heat. If the ram fails any of the tests, he should not be used. 4) Multi-sire breeding systems (3 or more rams) give greater assurance of high fertility than single-sire matings. However, the small size of the flock or the requirements for registration may not permit this procedure. When more that one sire is used, odd numbers (3, 5, 7) work better than even numbers (2, 4, 6).

Breeding time is also a good time to vaccinate for vibriosis. Sheep diseases affecting fertility will be treated more comprehensively in another presentation at this conference.

October to November breeding during cool fall weather will tend to maximize fertility as well as twinning (Table 5). Fertility and ovulation rate

Table 5. Effect of time of breeding on estrus and ovulation in Rambouillet ewes in Idaho (U.S. Sheep Experiment Station, Dubois, Idaho).

Month	% ewes in estrus	% ewes ovulating	CL per ewe ovulating[1/]
January	100	100	1.89
February	100	100	1.57
March	89	94	1.50
April	26	32	1.37
May	2	2	1.00
June	7	7	1.00
July	6	6	1.00
August	12	41	1.75
September	100	100	1.72
October	100	94	1.80
November	100	100	1.86
December	100	100	1.88

[1/] CL = Corpora lutea.

remains high in December and January, but will result in late season lambs. Special precautions must be taken to keep both the ram and ewes cool if one chooses to breed during hot weather. This includes shearing the ram about two weeks before breeding, providing shade during the heat of the day, plenty of cool water, and possibly putting the ram in only at night. Rams may benefit by some protection, such as a shed for a short while after sheering to reduce the possibility of pneumonia which one producer experienced. Heat can cause rams to become sterile and cause embryo mortality in the ewes.

The ram should be in good, strong condition from plenty of exercise and good feed, but he should not be too fat. The time in breeding should be extended for early-season breeding because of the tendency for lower fertility and delayed cycling in some ewes at this time of year. If ewes are on an accelerated program with summer or fall-born lambs at side, one must remember that those ewes on the average will not usually breed and conceive until about 40 days or later after the lambs are born. Even then early-weaning could enhance rebreeding. If early postpartum breeding is planned after mid-January, early weaning will normally be necessary before reasonably high fertility can be expected.

Avoid inbreeding in your own flock and do not purchase inbred females for use in your lamb production program. Inbreeding will lead to lower fertility, lower survivability, and slower growth rate. Normally, it is best to select your own replacement females from your best producing ewes. These should be wellgrown, thrifty, twin-born lambs which will breed at six to seven months of age, and lamb at a year of age, producing good, thrifty, marketable lambs. It is important to feed replacement ewe lambs at a relatively high level of nutrition to assure good growth and development prior to breeding and lambing. Selecting replacement ewes from only those which successfully lamb first at

about one year of age is important. This is a genetic trait and positive selection will improve the performance of the next generation. If it is not feasible to raise your own replacements, then obtain replacements from a reliable breeder of known integrity who has good quality stock free from diseases, such as footrot, or bluetongue, which could be a serious production and management problem.

A scourable paint or brick pigment mixed in corn oil placed on the rams brisket each day can give a good indication to the owner whether or not his ewes are breeding at the expected rate. Most of the ewes should be marked during the first 17 days of breeding. This system is usually quite accurate on pasture, but there can be many false marks in a feedlot. If breeding is not occurring as expected an alternate breeding plan may be substituted. The use of a sterile teaser ram starting about three weeks before one wants fertile matings will often enhance fertility at the beginning of the breeding period. A careful review and evaluation of the above factors with adjustments in management and breeding stategies can lead to high levels of fertility which is basic to better lamb crops.

Fertility alone is not enough in most situations to assure a profitable lamb production program. Each ewe, depending on the lambing rate desired, must contribute her share to the total lamb crop. A foundation to the desired level of productivity must be laid by selecting a breed or crossbred type which clearly has the potential to produce the number of lambs desired (Table 1). Then one must manage the total operation in such a way that the genetic potential can be realized.

Management Decisions

1) The first step is to select a breed which has the potential production you would like with other characteristics (Table 1). Crossbreeding using a

sire breed ram such as a Suffolk on whiteface ewes will quite consistently increase the pounds of lamb produced per ewe for commercial lamb production above what one might expect from breeding the ewes to their own breed of sire. Production will normally be increased even further in a three breed cross by using Suffolk rams on carefully selected crossbred ewes from other breeds which have the production potential you are seeking. The hybrid vigor derived from the above crosses normally results in more lambs born alive, better post-natal survival, and more rapid efficient gains.

2) Next you must select the breeding and lambing time or times. This decision is often based on the time that low-cost, good-quality feed is available or when the market price is sufficiently high to justify more costly feed (Figure 4). For example, in New Zealand and in much of the range country in

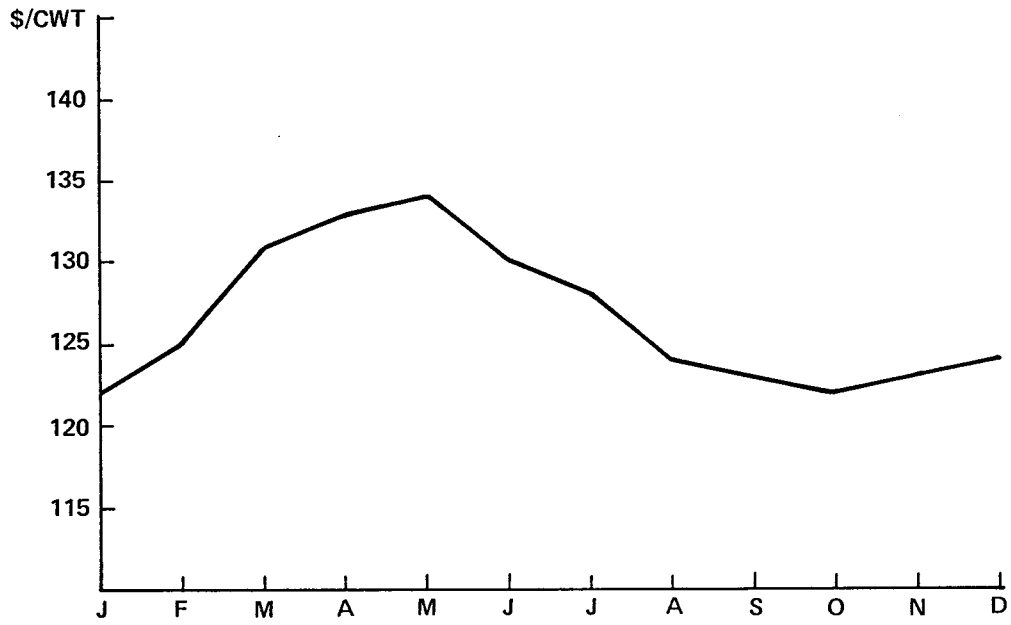

Figure 4. Average monthly wholesale lamb price 1982, 1983 and 1984 combined.

the west, lambing is scheduled so that the lambs are at an optimum age to take advantage of the flush growth of grass in the spring. In a different situation in Idaho farm flocks, lambing is often scheduled in the early winter when labor is abundant so that the lambs can be marketed in the spring when lamb prices are at the peak. This is economically possible because of the relatively low-cost, high-quality alfalfa hay and barley grown in the area and the extremely fast, efficient rate of gain made by these parasite-free young lambs in cool weather. The ewes are managed on ditch banks and small intensively grazed pastures during the summer and utilize the farm aftermath grazing during the fall and winter up to lambing.

3) The lambing interval can be an important management decision. Accelerated or short-interval lambing appears to be increasing with the development of prolific ewes with longer natural breeding seasons and with management techniques such as early weaning and also introduction of the ram at about 3 weeks before breeding is to start. To work, this system requires a high level of management expertise and commitment. Before deciding on an accelerated lambing program, one should consult with several producers who have successful accelerated programs and also conduct an economic analysis which compares the costs of harvested feed, pasture, labor and facilities, and income under both accelerated and conventional lambing programs.

An appendix to an accompanying conference report, "Polypay Sheep and Their Usefulness in Farm Flock Operations", gives the names and addresses of some flock owners with successful accelerated lambing programs who are willing to give you help. Brief descriptions of the operations are also included. Brian McGee, Cornell University, has developed an accelerated lambing system called the Cornell Star System published in the Lamb Producers Journal, Aug. 1984, page 7.

What can be done to save more lambs

Finally, what do I do to maximize the survival of lambs that my lambing management program has produced? Mothering ability which includes lactation is the basic and most important factor in lamb survival. Select a breed or select replacements within your existing flock that are relatively free from difficult births and produce an adequate supply of milk to ensure thrifty, vigorous, fast-growing lambs. Adequate nutrition of the ewe before lambing with at least 15% protein in the diet after lambing is important to insure good lactation. Mature ewes will produce more milk than young ewes on the average and growthy, well-developed yearlings will produce more milk than thin, small yearling ewes.

Vaccination of the ewes two weeks before the start of lambing with clostridium perfringens types C & D toxoid and a booster of the same vaccine to the lambs at about two weeks of age will protect against this common cause of loss. Feedlot lambs may benefit by another booster at 8 to 10 weeks of age. If white muscle disease or stiff lambs due to selenium and vitamin E deficiency is a problem, then a medication containing sodium selenite and vitamin E should be provided as an injection. Selenium may also be fed in a salt mix. If sore mouth is historically a problem, then vaccination should be planned. Ewes on pastures susceptable to stomach worms should be de-wormed before lambing. A wormer that will kill the larvae as well as adult worms would be recommended.

If lambs are born in the winter or during cold, wet, windy weather, protection of the lambs immediately following birth and until the lambs are about three days of age can be critical to survival. On the range, lambing ewes are often held in brushy areas or where there is dense, tall grass to provide protection for the newborn lambs. On the farm, wind breaks and sheds often are essential to lamb survival. The body heat of the ewe flock can do

much to raise the temperature in an insulated shed. Supplemental heat is usually not necessary when the lambs are strong at birth, born in a dry area free from wind or cold drafts, and nurse a ewe with adequate milk supply shortly after birth. Nursing is facilitated if the ewes are crutched (wool shorn from area around the udder) prior to lambing. Occasionally, when a lamb gets chilled and will not nurse, his survival can be remarkably enhanced by introducing warm colostrum milk directly into the stomach using a "lamb saver". This is simply a large syringe fitted with a metal or rubber tube. The tube is inserted down the throat into the stomach and the milk is injected directly into the stomach. If the tube will not go in at least 10 inches or the length of the metal tube, it probably means that it is in the lungs and should be withdrawn and reintroduced. Hold the lamb's jaw out in a straight line with the neck as the tube is introduced to facilitate introduction into the stomach. The chilled lamb is next placed under a heat lamp or other heating device, and normally, recovery is rapid. Once recovered, supplemental heat should be removed.

Studies have shown that when lambs and ewes are placed in lambing jugs, especially twin or triplet lambs, and kept together as a unit for 3 days and observed carefully for satisfactory nutrition and freedom from scours and pneumonia in the lambs and mastitis in the ewe, that survival is greatly enhanced (Table 4). Management indicated above was implemented in 1976 and reduced losses by 67%. If a lamb is not getting enough milk, consider grafting or supplementing with milk replacer. If lambs develop indications of scours or pneumonia, treat with appropriate recommended antibiotics. At the first signs of mastitis in the ewe such as garget or bloody milk observed at time milk plug is removed or when apparent lameness occurs due to acute mastitis (blue bag),

Table 4. Summary of cause of death in lambs from birth to 30 days of age in 1975 and 1976. (Gates, 1977).

	1975		1976	
Cause of death	Number observed	% of live lambs born	Number observed	% of live lambs born
Unknown	29	0.6	28	0.5
General infection	1	<.01	--	--
Man-caused accidents	2	<.01	3	<.01
Bloat	--	--	1	<.01
Pneumonia	44	0.9	5	<.01
Colibacillosis (scours)	265	5.7	82	1.6
Starvation	115	2.5	36	0.7
Enterotoxemia	37	0.8	22	0.4
Premature birth	2	<.01	--	--
Dystocia	41	0.9	12	0.2
Birth defect	13	<.01	6	<.01
Natural accidents	16	0.3	16	0.3
Navel ill	3	<.01	5	<.01
Suffocation	4	0.1	1	<.01
Peritonitis	5	0.1	1	<.01
Total Losses	577		218	
% Mortality of lambs born		12.6		4.1

treat immediately with intra-mammary Dri Clox[1/] or similar antibiotic and a systemic antibiotic such as penicillin-streptomycin.

Part of the improved survival from confining in lambing jugs is associated with social bonding between the ewe and her lambs so that mismothering is much less apt to occur when the lambs and ewes are removed from the lambing jug. When removing lambs and ewes from the jug, we prefer moving them, initially, into relatively large groups to avoid the trauma which occurs from the frequent mixing of smaller groups to increasingly larger groups.

Lambing facilities should be free of obstructions, narrow door ways, loose wire, loose boards especially those having nails protruding, unsecured panels, unlatched swing gates, or any other unsecured hazardous conditions which can kill or injure lambs or ewes.

Very young lambs are the most vulnerable to predators. Confinement lambing or other precautions to protect lambs from predators during this most vulnerable time can greatly reduce predator losses and increase net return to the producer.

Because of illness or death of a ewe or a litter of lambs which require more milk than a young or poor ewe can provide, it is often important to supply an alternate source of milk. The first option to find a ewe with extra milk. Perhaps she lost her lambs or has only one lamb but adequate milk for two. There is a period of time very shortly after birth when it is possible, with a high degree of success, to graft or foster lambs from their true mother to a foster mother. This is described in detail in an article entitled, "How

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[1/] Names of products are included for the benefit of the reader and do not imply endorsement or preferential treatment by USDA.

to Graft Lambs", and is available from the University of Idaho, Current Information Series No. 469, March 1979. Briefly, very soon after the birth of a new lamb, live or dead, the mucus or slime from the new lamb can be thoroughly rubbed into the wool of the lamb needing a milk supply and the mother which was the source of the slime will usually readily accept the orphan lamb. After the new lamb dries off, this technique can no longer be used. An alternate method is to immerse both lambs in a bucket of salt water and then rub the two lambs together. Another method is to skin the prospective foster mother's dead lamb and put the skin on the lamb needing milk. Fluids from the dead lamb are also rubbed onto the head, feet, and legs of the orphan lamb. Finally, when all else fails, the English fostering pen system usually works after 5 to 7 days of confinement of the ewe in a stanchion pen with the new lamb or lambs. This technique is very useful to put an additional lamb on a ewe with an abundance of milk but only one lamb. When the milk supply is marginal but a good grafting situation is not available, one can simply supplement the hungry lambs with a milk replacer product. When the lamb has access to some milk from its mother, it is frequently necessary to warm the supplement. When the lamb is about 4 weeks old and eating creep feed reasonably well, the supplemental milk replacer feeding can be stopped.

There is no substitute for experience and careful observation in developing a profitable satisfying lamb production program. Remember, it is the "eye" of the Shepherd and his ability to profit by experience, learn new techniques, and implement new ideas that makes the difference between success and failure. YOU CAN DO IT!

Reference

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