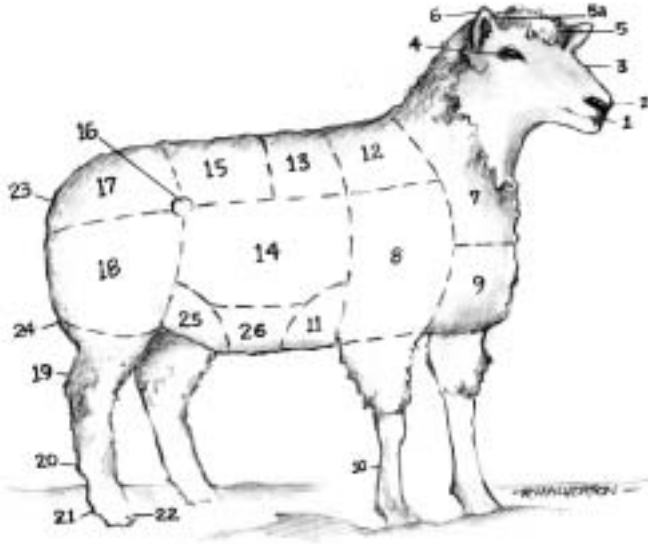


# APPENDICES



APPENDIX I

Some Typical Sheep Facts



SHEEP PARTS

- |                              |                  |
|------------------------------|------------------|
| 1. mouth                     | 14. paunch       |
| 2. nostril                   | 15. loin         |
| 3. face                      | 16. point of hip |
| 4. eye                       | 17. rump         |
| 5. forehead and forelock     | 18. thigh        |
| 5a. poll                     | 19. rear leg     |
| 6. ear                       | 20. pastern      |
| 7. neck                      | 21. dewclaw      |
| 8. shoulder                  | 22. foot         |
| 9. brisket                   | 23. dock         |
| 10. foreleg, including shank | 24. twist        |
| 11. foreflank                | 25. rear flank   |
| 12. top of shoulders         | 26. belly        |
| 13. back                     |                  |

## APPENDIX 1

weight of adult ewe: 120–325 pounds  
weight of adult ram: 160–400 pounds  
rate of weight gain of lambs: up to about 1.5 pounds a day  
wool clip: 8 pounds avg. (4–35) per year  
period between heat cycles: 16.5 (14–20) days avg.  
duration of heat: 24–48 hours  
duration of gestation: mutton breeds 144–147 days, wool breeds 148–151 days,  
Finn & crosses 140–142 days  
water intake: adults, 1.0 gal/day; lactating ewe, 1.5 gal/day; lamb, 0.5 gal/day  
rectal temperature: 102–104° F  
heart rate: 75 (60–120) beats/minute avg.  
respiratory rate: 19 breaths/minute  
daily urine volume: 10–40 cc/kg body weight  
daily feces weight: 1–3 kg/day  
principal use of sheep pelts: covering sheep  
usual sound: baa

## APPENDIX 2

### Marketing

Unless a few lambs are being raised as pets or for home consumption, there comes a time when they must be sold. That can be a pleasant, profitable experience, or it can be an event when you go to a lot of work only to be left feeling that you've been cheated or at least taken advantage of. The same is true for selling breeding stock and disposing of older ewes and rams. Finally, unless you are a handspinner, or love to make wool-filled quilts, you will have to try to sell the wool from your sheep. All of this is marketing.

The time to consider marketing alternatives is not a few days before you are ready to sell something, but long before you decide to raise sheep as a business, even if only part-time or as a hobby. Nobody should consider raising sheep if there is no convenient market for the products that will come from the enterprise. There are two sorts of markets: the ones that are already in place, and the ones that the producer develops from scratch. Unless you are the sort of person who thrives on the challenge of making something from nothing, you had better be sure there is a handy way of selling your sheep and wool.

### LAMBS

Lambs are the main product of any sheep operation, no matter how big or small. Their ultimate destination is usually someone's plate, at home or in a restaurant, but their route there is very roundabout in some instances. How, then, do you get them to their destination? (Let's assume the lambs are in a proper state of fattiness or condition for slaughter, and that they are at a desired market weight, generally in the 105–135 pounds range.)

#### Direct Sales to Consumers

Many small producers, and some that are not so small, take a do-it-yourself approach and try to sell lambs direct to the consumer. To be a success, there have to be enough customers to buy the lambs. I realize this statement is so obvious as to be almost insulting, but there are many direct-to-customer marketing schemes that failed because this point was ignored. You will need

people who are used to eating lamb, which greatly reduces your chances in rural areas, particularly in the Southeast and much of the Midwest. You also need people who are used to buying foods in quantity, because you want to sell whole lambs, not retail cuts. Potential customers used to be mostly affluent middle-class people, most of whom lived in city suburbs. That profile has changed dramatically in the past decades as more immigrants from North Africa and the Middle East have entered the United States. The Muslims among those potential customers prefer uncastrated male lambs weighing 50–80 pounds live weight. They often also want to slaughter the lambs themselves to meet religious requirements for halal slaughter.

No matter how many ideal customers are in your imagined sales area, you will still have to reach them. Word of mouth is by far the most effective means in the long run, and this means knowing a few people who can spread the news at work, school, at their church or mosque, club, or other social gathering place. Classified ads in a local advertiser or shopper newspaper can work too if the ads are really read by your potential customers. There are many Muslim students at universities who long for fresh lamb, and they can be your contact with a larger lamb-eating community.

Once you have reached your customers you will still have to get the meat into their freezers. In most regions you will find that it is far too complicated to try to sell packaged cuts or even whole sides because of health laws and regulations that govern slaughter and butchering, especially slaughter. You will doubtless find that it is illegal for you to sell a dead lamb, no matter where it was slaughtered, much less if it was done in your barn or under a tree. The way to do it legally anywhere is to sell the customer a live lamb, and then let them make the arrangements for slaughter and butchering. Some customers prefer to pay a locker plant to do all of the work, providing a box of neatly wrapped and labeled cuts made to the customer's specifications with minimum fuss. You have sold a live lamb, which is legal, and the customer has arranged for slaughter and butchering for personal use, which is also legal. The Muslim customers who want to do the slaughtering themselves can be provided a place at your farm if your state laws allow it. Check with your state's health department.

As to pricing, you can use local market prices as published in newspapers as a guide. If you think that your lambs are better in some ways than the run of the lot sold through conventional marketing channels, then say so and expect a higher price, but don't get greedy. If you can show your customers a

clean farm with happy-looking sheep (although I'm not sure how one tells whether a sheep is happy or not), or can show that all the feed you give is natural or organically grown, or that they are raised on a special sort of feed (seaweed, herbal pastures, or whatever gimmick is unique to your lambs), then maybe you can get more for your product. If you have no local prices to use as a guide, then you should realize that a lamb carcass is about half the weight of a live lamb and that about 70 percent of that weight is retail cuts. Check prices at a local market, or ask a butcher what the current price of lamb carcasses is. Some producers set a fixed price per lamb and let the buyer choose which one they want. That certainly eliminates problems of weighing. Otherwise, the live weight can be taken at your farm or at the locker plant.

Your price should be on the farm, or else should include a charge for delivering the live lamb to the locker plant of your customer's choice. You will probably end up delivering many of the lambs sold. Be sure to make all of the costs clear to the customer before a deal is concluded, and remember that the customer is always right. Do make sure that they realize that the yield in cuts will be only about a third of the live weight, even less if any cuts are boned. The last is important if the customer is used to beef, which has higher yields.

### Local Auction Sales

A common way to sell small numbers of lambs in rural areas is to take them to a local livestock auction. Many people come to those sales to buy animals for the table, and you will have little trouble selling your lambs. You also probably will have very little trouble fitting the money in your wallet, because the price you get will generally be well below market price. Most of the people who come to buy at livestock auction sales are either bargain hunters for their own table, or they are people who make their living by buying animals at local auction sales and reselling them to a packer or at a terminal market. Naturally they cannot pay market price, or they would have no margin of profit for themselves. Most local markets put a maximum number of middlemen between you and the ultimate consumer, and the price you get shows it. Also, you will do all of the hauling and pay a commission to the auction yard. For the most part, the buyer at a local auction gets a good deal, and you don't. There are notable exceptions to this generality, so check locally. Some local auctions have sweetheart deals with packers, or can carry transportation costs on the backs of some other enterprise, or have various ways to pay a high price for some types of animals that they want badly. Don't discount the area

auction without checking, but don't expect to find good deals very commonly. Be suspicious.

### Terminal Markets

Probably the most common method of lamb marketing for the average producer is to get the lambs to a large terminal stockyard, where they are purchased by buyers for the big packing plants. The prices will generally be higher than at local auctions, and you might even get to keep some of the money. What I mean by that is that there are a lot of costs involved. First, there is the cost of getting the lambs to the marketplace. If you do that yourself, you know the costs. If you hire a trucker to haul your lambs, you will pay a going rate plus insurance. The trucker will also have a pickup charge for each load and possibly other charges. You will consign your lambs to a representative at the terminal market. Usually a marketplace of any size will have a number of competing organizations that are in the livestock selling and buying business. They get a commission for their services, and for that reason the person who does the selling for you is often referred to as your commission man.

In addition to the charge for selling, you will find yourself laying out money for hay, health inspections, use of the yard facilities, and other costs. Each of these costs is small, but they add up and will generally total from as little as two or three dollars per head to much higher figures. In an informal survey of our local sheep raisers' association, the total of trucking plus the commission and other costs came to between five and nine dollars per head for the market at South Saint Paul, Minnesota, which is about 150 miles from the farm area. Compare expenses and decide whether a large terminal stockyard is for you.

The key person in the large terminal market is the commission man. First of all, you want to have a person represent you who is savvy about lambs and sheep, so try to find a firm that has one or more persons who deal exclusively with sheep rather than one that has a pig or cattle expert who also handles a few lambs once in a while. If you have a choice of firms, ask around your area to find out which one has a reputation for getting top prices and paying promptly.

Once you have decided on a firm to represent you, get a load of lambs together and send them off to see how they do. One way is to select some that look like they are big enough and ship them. Doing this will generally not get

you the best possible price though. To get a top price, the loads you ship should be reasonably uniform, and they should be aimed at a particular market. For example, if you are selling lambs as feeders, then they all should be ewes or wethers (no rams!) of about the same weight. They should have no tails or dungy rear ends, and should be reasonably clean. This doesn't mean that you have to run them through the car wash before you send them, but don't send any really dirty lambs or the buyer will be suspicious that you are a poor manager, and that there may be other, hidden things wrong with them. Spiffy-looking lambs get a better price even if they are actually no better than cruddy-looking ones. Whether feeders are shorn doesn't usually make a great deal of difference, but a freshly shorn feeder saves the feedlot owner the bother and expense of doing it, so you might get a bit more money.

If you market lambs as slaughter animals, you can make yourself a few extra dollars by paying attention to certain details. First of all, be sure that all of the lambs will grade at least Choice, or else they will have to be sold as feeders regardless of their weight. (I'll discuss grading lambs a little farther on.) Next, make every effort to have the lot as uniform as possible; in other words, all lambs should be about the same weight, the same general breeding (blackfaced or whitefaced), all either shorn with number-one and -two pelts or all unshorn, and so forth. The more uniform a lot looks, the more favorably the buyer will react to it. Uniformity tells the buyer that the shipper is doing a good job of raising and managing sheep, and that is worth money. A given lot can be made up of all ewes and wethers or can include a few ram lambs. If the ram lambs make up only 10 or 15 percent of the lot, there will generally be no effect on price. If you have a large number of heavy (125 to 140 pounds and up) ram lambs, they should be grouped separately or else they will drag down the price of the whole lot. One way to arrange the sale is to take a dock on the rams so that only they are affected rather than the entire lot.

Details vary from place to place, year to year, and with time of year, but heavy lambs can be subject to price docking. This is usually not the case in spring when heavy lambs are in short supply, but later in the year they become abundant, and penalties are exacted. Usually a top weight is established by a packer or by a marketplace, and weight above that cutoff results in a reduction of the price paid for the whole lamb. For example, if the cutoff was 125 pounds, and a lamb weighed 140 pounds, a penalty would be applied for the extra fifteen pounds. It is very much to the advantage of the producer to avoid such dockages by shipping earlier. Feed conversion is also generally

poorer for large lambs. Remember that the weight that matters is the weight at the selling point, not the weight in your barn. Thus, lambs that are heavier than the cutoff by a few pounds can be safely shipped because they will lose the weight before weighing. Also, weights are generally average weights because a bunch of lambs are run onto the scale together, weighed, counted, and an average weight determined. You can mix in some lightweights to balance the heavies, so that the average weight stays below the cutoff. You don't want the disparity between the lightest and the heaviest to be too great, because that will reduce the uniformity of the lot, but a certain amount of variation is tolerable.

Just to confuse things, some packers will pay a premium for heavy lambs. Check your local situation.

I hope all this convinces you to buy a scale. If overweight dockage is costing you a dollar or three per lamb, it doesn't take very many lambs sent at acceptable weights to pay for the scale. If the idea of all the messing with the lambs and weighing them bores you, think again. Selling the lambs is the finale of your time and effort. Don't scrimp on your work now and reduce your profit for lack of a little time spent in the barn or pen. All those sleepless nights during lambing are wasted if you don't get top dollar for your products. Sure, you may get a good price for your wool and sell some breeding stock, but market lambs are your bread and butter. After you have weighed lambs for a few years you will find that you can estimate the weights pretty closely, so look at all the weighing as partly training to make you a better guesser.

All of this does not mean that you cannot ship a mixed lot of lambs, but have it made up so it can be conveniently divided into smaller lots for selling. You might ship some wethers at an average weight of 130 pounds, some ram lambs at 115 pounds, and some ewes and wethers at 110 pounds. Make it easy for the commission man to sort them into groups, and you'll get a better price. Be especially sure that they all grade Choice or Prime so he doesn't have to take out unfinished ones for sale as feeders.

With finished lambs, be sure the commission man knows that they will be ready to sell. Ideally, you should accompany some lambs to market to meet your representative and to get acquainted with what that market requires or expects. Ask a lot of questions, and you will learn a lot. Once the commission man knows you, and finds that you can be relied upon to deliver a good product, then you can be assured of getting the best price he can muster for you.

Once you have established your reputation with him, all you have to do is phone ahead to tell your representative what you are sending and to ask what price you can expect to get. You may also get advice as to whether to hold them a few days for a better market. A person who is selling and buying lambs every day can give you lots of help, so use him.

Some terminal markets are real auctions in which all dealing is in the open for anyone to observe. Others have all business conducted by what is called private treaty, in which the seller and buyer negotiate on a one-to-one basis until a mutually agreeable price is reached. The seller may also be negotiating with other buyers so that a private treaty sale can be almost as competitive as an auction. One possible conflict in the private treaty arrangement, or even in some auctions, is that the commission man may represent both seller and buyer. If this is the case at your marketplace, you can only hope that the person representing you is the type who can play both sides of the game without prejudice. Some of these arrangements seem to work satisfactorily, at least most of the time.

## Grading Lambs

Grading lambs is not a complicated procedure, and it is something that every sheep raiser should take the time to learn. Even if you raise only a lamb or two a year for your own table, you should be competent to decide when it is ready for slaughter, or else you'll be getting it overfat and wasty or maybe have a bag of bones in your freezer.

There are two factors in grading a lamb for market. One of these is the condition of the pelt. An unshorn lamb, in the strict sense, means that it has never been shorn. However, in the trade, a lamb with wool longer than an inch and a half will usually be graded as unshorn, even if it actually was shorn once. Shorn lambs will have number-one pelts ( $\frac{3}{4}$ -inch to  $1\frac{1}{4}$ -inch wool), number-two pelts ( $\frac{1}{2}$ -inch to  $\frac{3}{4}$ -inch), or number-three pelts ( $\frac{1}{4}$ -inch to  $\frac{1}{2}$ -inch). The length of the wool equals the shortest fibers on the main part of the pelt, not including the wool of the legs or belly. Some people use a dime to measure with because a dime's diameter is just short of  $\frac{3}{4}$  inch, so if the wool will cover a dime everywhere it is a number-one pelt.

The other factor in lamb grading is judging the flesh and fat cover over the ribs, loin, and hips. By far the best way to learn grading of finish, as this is called, is to be instructed by a person who is qualified to grade lambs. This could be a producer, a lamb buyer, a 4-H kid, or a county fair judge. If you

can't find a person to instruct you, you can do a passable job with some instructions. First of all, you need an average sort of hand, not either bony or pudgy. Make a fist of your average hand. If the lower part of the ribs of a lamb feels like the back of your hand or is better covered, the lamb grades Prime. If it feels like the fingers pressed together on the front of your fist, it grades Choice. If it feels like your knuckles, it will not grade Choice, so feed the lamb more or ship it as a feeder.

After making a preliminary decision based on rib cover, you should feel the area over the loin—the area on either side of the spine between the dock and the last ribs. With a blackfaced breed or its crosses, if the lamb is to be graded Prime you should not be able to feel the backbone prominently, if at all, when you place your palm over the loin. With whitefaced breeds, the spine can be a little less covered and still make Prime. With lambs that grade Choice, the backbone can be felt, but should not be prominent or knobby. No lamb that grades Choice or Prime should be bony over the hips, nor should the spine feel very bumpy when you run your thumb the length of the backbone. If you want a further check, feel the top of a rear leg. It should be full and round in a Prime lamb. Grading is a difficult skill to acquire merely from reading about it, but give it a try, and then ask your commission man to check your grading out and give you suggestions.

Do be aware that weight is not a factor in grading. A lamb can grade Prime at 80 pounds, or one could fail to make Choice at 140 pounds. Some breeds finish earlier, at lighter weights, than others. Also, the feeding program influences at what weight a lamb will finish. Some small breeds such as Cheviots, Finns, and Southdowns, put on a high-energy ration, can finish out at 70 pounds, whereas a Rambouillet out on the range might not be finished at 140. It is a matter of adjusting the feeding schedule to the breed to achieve the desired finish at the desired weight.

### Cooperative Marketing

If you can get together with a group of other sheep raisers, you may be able to influence the market a little bit by virtue of the larger numbers you have to bargain with. A packer's buyer is much more interested in handling a semi-trailer load of 400–440 lambs than he is your pickup load of 12, for obvious reasons. The least complex sort of cooperative marketing is to assemble a load of graded lambs with some other raisers and negotiate a price with a buyer. The buyer can be an entrepreneur or a packer buyer, most commonly the lat-

ter. There are so many variations on this scheme that it would be useless to try to cover them all. The important advantage here is that yardage and commission costs are saved, and the packer will pay more for a coherent lot of lambs than for a number of small groups. When and where the lambs are to be weighed and who pays for the trucking are the two salient points to be considered in making a deal. Remember that lambs will lose a lot of weight during transportation and in holding pens, so be wary of any deal in which they are moved or held for any length of time prior to weighing. It doesn't really make any difference if the weighing is done at the packing plant after travel and an overnight stand, but the price agreed upon should be high to reflect the weight loss, or shrink, that would take place between the farm and the scale. If there is no agreement on a reasonable estimate of shrink, weigh the lambs at the point of origin and compare that with the weights at the packers. Then you have some facts in front of all the parties. For receiving payments from the current government support program, you will need weights at the point of slaughter, so be sure that your lambs can be identified. Check with your local Farm Service Agency office for details. To find its location try [www.fsa.usda.gov/edso/](http://www.fsa.usda.gov/edso/).

### Electronic Auctions

Another, somewhat more elaborate, way to market lambs in truckload quantities is to go through a teleauction or electronic auction. In this arrangement, a company sets itself up in the business of selling loads of lambs to packers. Lamb producers in a given area either grade their lambs themselves or have them graded and give the information to an area coordinator, who organizes the load on paper and telephones the description of the load (weights, sex, breeds, type of pelts, grades, and other information) to the teleauction company. The auction is set up by phone lines and a central computer is used to do the bookkeeping during the selling period. After a few minutes, bidding closes and the high bidder is notified. Bidders do not know who is bidding on the load; at least they are not meant to know. The packer that gets the bid then designates a loading date and time when one of his trucks will pick up the load at one or more loading points established by the producers. On the chosen day, generally within a few days of the auction day, the producers deliver their lambs, the lambs are weighed and loaded, and the truck hauls them away. Producers' checks are mailed out promptly by the teleauction company, which in turn collects from the packer.

The big advantage of the teleauction is reduced costs to the producer and, usually, sales at a higher price than at most of the terminal markets, depending on the area of the country. As an example, a teleauction in the central part of the country, Cornbelt Lamb Teleauction of Baraboo, Wisconsin, charges less than a dollar per head for its services. In our area of western Minnesota, the cost to a producer who grades his own lambs is less than a dollar and a half per head plus whatever it costs to get the lambs to a loading point, generally less than fifty miles distant. The total cost includes the teleauction fee and a small fee per lamb to pay a coordinator, the loading point and weighing facility, and to cover expenses incurred by the coordinator, mainly phone calls. In the ideal case, producers call the coordinator with descriptions of their graded lambs. When a load is put together on paper, an auction is held and the load sold. The electronic-auction organization notifies the coordinator of the price and the loading date and time, and the information is passed on by phone to the producers. Producers bring their lambs to the loading point, where the coordinator supervises weighing and loading and telephones final weights and numbers to the teleauction office.

Naturally there are glitches in real life. Trucks are late, producers are late, some producers get mad and back out (and are not welcomed back with open arms—ever), mistakes are made in the paperwork, lambs are delivered that do not grade Choice or better and have to be sent back, and so it goes. Sometimes the high bid is not sufficient, and some sales are made by private treaty, or the lambs can be held for another sale at a later date. These deviations from the ideal scheme are just part of real life and should be accepted as problems to be solved on an individual basis. When an electronic auction works right, and even when it doesn't, the return to the producer is higher than in most other ways of marketing.

### Healthy Competition

Each marketing possibility must be judged on the basis of your local situation and alternatives weighed one against the other. The best possible condition is to have two or more alternate ways to market lambs to keep healthy competition alive. In our area there are two terminal markets within a 150-mile radius, one local auction that emphasizes a lamb market and is trying to build its livestock trade, and a teleauction in full operation. The producer can list his lambs with the teleauction. If that sale doesn't materialize for some reason, there is still the option of shipping to one of the terminal markets or hauling

the lambs to the local livestock yard for sale every Wednesday. We feel very fortunate to have a competitive marketplace that wants our lambs.

## OLDER SHEEP

As sheep age, at some point they have to be culled from the flock to make way for replacements. Retirement for a ewe or ram generally means a trip to the Mexican border or Florida where they are eagerly sought after as bargain protein by Hispanic families. The market for culls is much less variable in terms of price than the somewhat volatile lamb market, and there are only minor seasonal variations.

Older sheep should be shipped whenever it is determined that they are no longer productive members of the flock. That can mean anytime, but it is wise to consider availability of feed and the sheep's condition. A well-fleshed old sheep will bring a better price than a bag of bones. In the middle of winter when stored feed is being used it is probably wise to ship the sheep regardless of condition. The feed needed to add weight and finish will likely cost more than any possible increase in market value. In contrast, a ewe that comes out of weaning in thin condition may be doing so at a time when pasture is in surplus, so it is better economics to have her eat a while on cheap food and put on a little extra flesh.

## BREEDING STOCK

In an ideal world of sheep raising, all lambs are raised to be sold at fancy prices to an eager crowd of buyers who can hardly wait to buy them as breeding stock. Very few shepherds manage actually to live out this dream in its entirety, but selling breeders is a good way to make a bit more money from sheep raising.

Many producers sell breeding stock without even realizing it, because some ewes that are sent to market, even some old culls, are bought by sharpies and resold as breeding animals. The real crooks buy lots of cheap ewes and sort them out into look-alike flocks and feed them up to make them have a healthy and pleasing appearance. Then they seek out buyers with a cover story such as that they are forced to get rid of their beloved flock because of financial woes, a divorce, ill health, or any one of a million phony excuses. You

cannot avoid supplying these scoundrels, but you can at least avoid buying from them. Be sure to warn newcomers to sheep about the existence of such con artists. Nothing will discourage a new shepherd faster than a flock full of ewes with bad bags, infertility, chronic disease, and the like.

You can legitimately sell your older ewes as breeding stock instead of shipping them as culls. You'll get a better price, and have the satisfaction of not having to send an old friend to a dog food plant or a Mexican butcher shop. If a ewe still has a good bag and is fertile, she may be just what someone is looking for. Let it be known that you routinely sell your less productive ewes every year, and you may find customers beating a path to your door. You can even sweeten the deal by exposing the ewes to a top quality ram and selling them as bred ewes for a little more money. To keep your reputation and a clear conscience, you'd be wise to guarantee that they are bred and that they will freshen with a good bag. If they don't, refund the buyer's money and ship them as culls. For both you and the buyer, it is a good deal.

The next rung up the social ladder for purveyors of breeding stock is selling young commercial ewes. Commercial ewes are usually crossbreds of some sort that are used to crank out market lambs. They can be of any breed, though it is currently popular in many parts of the country to use whitefaced ewes with a blackfaced, purebred ram on them to make growthy market lambs. A whitefaced ewe will produce a bigger wool clip than most blackfaced crosses, and the wool is generally of a higher quality as well. Lambs from the black on white cross have the growthiness of the sire breed plus the vigor of heterosis, or crossbreeding vigor.

Many shepherds specialize in producing commercial ewes as replacements for sheep raisers who prefer to buy rather than raise their own. Reputation is everything in this business, as I guess it is in any business. Honesty in dealing, high quality of ewes, and getting known are the touchstones of this endeavor. Honesty is something you can control, and the quality of the ewes is a matter of breeding and good management, factors you can also control. Getting known is a bit more difficult. If you are new to sheep raising, nobody knows either you or your sheep. The first thing to do, once you have some ewes to sell that you are proud of, is to advertise. This means listing your name or that of your farm in magazines and newspapers that will reach sheep raisers, or, more importantly, sheep buyers.

Most sheep purchasers are cautious people, as they should be, and they will want to see your name in print for a while before they even consider buying

sheep from you. List yourself in a breeder's directory in a magazine, use classified ads, and you may even want to put a block ad in magazines now and then. Keep doing this, consistently, for a few years, and one year you will be pleasantly surprised when the potential buyers start writing you and phoning you about getting some of your sheep. If there is an annual ewe sale in your area, consign some of your best ewes to it. If they are really good ewes, and you can make sure that they are, your reputation will benefit. For a ewe sale, be sure to have the sheep neatly sheared if they are blackfaced and trimmed attractively if they are wool breeds. Have the lot uniform in size, breeding, and appearance. You will undoubtedly get more for them than you would from a packer, so don't be disappointed when they nevertheless go for a little less than you might have dreamed. If you stick with it, in a few years' time your reputation will grow and you will get more for your ewes. Be patient.

A bit higher up the social ladder of breeders is the sale of purebred and registered sheep. These animals almost always command a higher price than their mongrel and unpedigreed cousins.

Purebreds are a known product, at least to some degree, and you can justly charge more for them. A purebreeder is expected to cull his registered flock severely and adhere to breed standards. A good purebreeder will ship a lot of his lambs to slaughter if they don't meet the standards of the breed and his conscience. Some purebreeders sell registered individuals of outstanding character for one price and unregistered purebreds at a lower price as commercial ewes or rams. Many purebreeders maintain both a registered flock and a purebred but unregistered flock.

Breed association politics is a lot more important in the purebred business than in other sheep enterprises. The successful seller of costly breeding stock has to show sheep at the right shows and win often, as well as buying quality stock to improve the flock. Advertising is very important in the purebred business, as is active membership in sheep associations of various sorts as well as the breed association. Publicity is vital and should be actively sought. If you enjoy sheep more than you do people, then you probably should steer clear of dealing in big-time registered sheep because a large part of it is public relations. Just having top quality sheep isn't enough.

There are a few shepherds who specialize in unusual types of sheep, such as the less common purebreds or sheep with colored wool. The rules of this game are really the same as with raisers of any commercial or purebred sheep except that the market for the product, breeding stock, is smaller and more widely

scattered. On the other side of the coin, there is less competition too, so one factor must be balanced against the other in making a decision to enter this field. Before you make a big commitment to such an enterprise, think it out and work slowly unless you have money to spare. A specialized operation can evolve from a commercial sheep farm as your reputation gets a chance to grow.

We played all of these games simultaneously, as do many sheep raisers. We had a commercial flock that we were gradually converting to a specialized wool type. Our commercial flock gave us most of our market lambs. We selected outstanding crossbred ewes from our lamb crop to sell as commercial breeders. In addition, we used colored rams on part of the flock to produce some black and gray sheep, the best of which we sold as breeders. We also maintained a nucleus flock of registered Lincolns for our own use in a crossbreeding program and to produce registered stock for sale. This sounds more complicated than it was, because the only time we really had to treat the subflocks separately was during breeding. For the rest of the year the flock was fully integrated, black and white, blueblood and peasant, living together in perfect harmony.

## WOOL

As with selling live lambs or sheep, there is more than one way to sell wool. The simplest way is to hire a shearer and then sell the wool to him. Most shearers will buy wool, either on their own or as an agent for a large wool-buying firm or cooperative. This method is handy, but will usually net you less cash than other methods. Because it is almost no bother, though, this is an attractive way to solve the wool problem.

You can learn to shear your sheep yourself and save the cost of hiring someone, but equipment is expensive and you may find that your health or physique is not up to the task. You will still have to find a buyer, such as a company representative or even a hide and fur dealer, although they generally pay less than other buyers.

### Wool Pools

Shepherds also band together and market wool cooperatively by forming what is called a wool pool. Members of a pool establish a set of rules and try to get a good price by marketing in lots large enough to fill one or more railroad boxcars or semitrailers. Pool members generally commit a given number of fleeces to the pool when the wool may still be on the backs of the sheep,

and pay an earnest-money deposit of fifty cents a fleece or so to guarantee that the promised fleeces will be delivered at some future date. The pool either makes a group decision or appoints one or more people to sell the wool. Bids may be called for or negotiations may be made with a single buyer or broker. Once an offer is accepted, a loading point and date are established and pool members bring their wool to be loaded. The wool is generally weighed at the time of loading. As with other cooperative ventures, the price received is generally higher than that which could be expected by an individual producer marketing wool alone. Many pools will set a bottom price and will not sell the wool unless that lower limit is exceeded. If, after some agreed upon date, the pool wool is not sold, members can take their wool away from the pool commitment and get their earnest money refunded. Most pools, however, tend to keep the wool in the pool until a satisfactory price is obtained, so if you join a pool, be prepared to store the wool for some time if the market is below the expectations of pool members.

I should mention that there are pools and pools. I mean by this that some pools have been established so long that they are really just wool buying companies rather than co-ops. As in politics, some are more responsive to the little person than others. You'll have to check your own area to discover what your options are. Our area sheep producers' association formed a pool from scratch, and it was a success for many years, so you might want to consider starting a new pool if there is no existing one.

## Wool for Handspinners

Direct marketing to handspinners or selling to spinning and weaving shops is a small but vital part of the wool growing business. The single factor for success in this field is quality, and quality mostly means cleanliness. Handspinners want to do their spinning in their homes, not in a barn, and they understandably don't want wool that is full of vegetable matter like burrs, seeds, and alfalfa leaf, or filthy with dung or mineral dirt. If you want to compete in the handspinners' wool market, you will have to keep your wool clean, clean, clean. That means raising sheep outdoors away from bedding in a barn. It also means feeding hay in such a way that a lot of it doesn't end up in the neck wool and shoulder wool (see Horsepasture Mfg in Supplies in appendix 6 for one design), and it means keeping pastures free of noxious weeds that contaminate the fleeces. Shearing has to be done in a clean place and done carefully to avoid cutting fibers in half to make so-called second cuts. The

*The county fair: the word on the building leaves no doubt about what's here.*



fleeces must be skirted; that is, the leg, belly, and face wool should be removed as well as any tangled or cotted portions. All of this is more work, but the rewards are high since the skirted wool sells for up to ten or more times as much as what you could expect from a wool buyer for ordinary fleeces.

Naturally you will have to develop your own market just as you will when trying to sell lambs to consumers. As in that situation, you will have to get the word out by advertising, and be altogether uncompromising with yourself in selling only a first-rate product. A good reputation will give you a cadre of satisfied customers who will buy from you again and again, and will also tell their spinner friends about you.

People often ask what type of wool is best for handspinning. The answer is clean wool. Length, fiber diameter, and color are matters of taste, and every spinner is different from every other one. One individual might prefer a fine, short wool to make a garment to be worn next to the skin, whereas another might want a coarse, even hairy, fleece to use for a rug or a wall hanging. There



*A handsome lineup of  
Hampshire rumps.*

is no such thing as a type of fleece preferred by handspinners, except that it be free of contaminants. Probably the best course is to specialize in a given type of wool, and when you have figured out how to keep it clean, seek a market for it. To reach the right people you will have to advertise in handspinning and weaving magazines. If you live near a college or university, ads on bulletin boards are often effective. Before you try to sell handspinners' wool you should become a handspinner yourself. If you are not a spinner, or your spouse or other close friend isn't, you won't understand a spinner's needs, and you will make mistakes that might prove fatal to your budding business. You should know your customers and how to reach them. Above all, don't let an unsatisfied customer go without a prompt refund or replacement. If a purchaser is not satisfied with a fleece, that is her or his judgment, not yours. Dirt, manure, and vegetable matter like alfalfa leaf may be a part of your life, but they are not a part of your customer's, so look at your fleece with that in mind. A customer rightly expects a clean fleece, by her or his own definition of clean.



*Some 4-H lambs relax after winning prizes for proud owners.*



*A youngster competing in open-class judging answers a judge's question.*



*Handspinning  
wool in a county  
fair sheep  
building always  
arouses the  
interest of  
passersby.*



## APPENDIX 3

### About Sheep Drugs

With the exception of some sprays and dips and the like that are under the supervision of the Environmental Protection Agency (EPA), the agency that approves drugs and various other chemicals for use with sheep is the Food and Drug Administration (FDA), which is part of the Public Health Service, which is, in turn, part of the Department of Health and Human Services. Notice that the FDA has nothing at all to do with the Department of Agriculture (USDA), or the Federal Trade Commission, or the Customs Service. It has no relation at all to the Animal and Plant Health Inspection Service (APHIS) that is part of USDA and is concerned with the importation of sheep insofar as control of disease is concerned. It is APHIS that has control of the scrapie eradication program, for example.

### APPROVED DRUGS

An approved drug is one for which extensive tests have been made to demonstrate that the material (1) does what it purports to do (control a disease for example); (2) does what it does without harm to the animal being treated; and (3) when used with with an animal does not constitute a risk to humans, especially with food-producing animals such as sheep. The testing is done by the manufacturer of the drug or its agents and cooperating institutions such as universities and trade associations, all of whom are called sponsors. When the FDA approves a drug it means only that the sponsors have submitted data that the FDA considers adequate to demonstrate that the drug is safe and effective for the indications listed on the label, when used in accordance with label instructions.

If you as a shepherd use an approved material according to the label, then you are probably safe from prosecution if an illegal residue of the drug is found in one of your lamb carcasses. Also, if you use an approved drug according to the label and a bunch of your lambs roll over dead as a result, you can attempt to get recourse in the courts from the manufacturer, the sponsors, and FDA. (I am using words like “probably” because any decision on an individual case is up to a court of law.)

On the other hand, if you used an approved drug in an unapproved manner or used an unapproved drug in a food-producing animal and illegal residues were discovered in the meat or milk, then the product would be subject to condemnation for use as food, and you could possibly be subject to regulatory action by the FDA, such as seizure of the food, issuance of an injunction, or prosecution for causing the residues. In addition, if the material was unapproved or used in an unapproved manner, you would have no recourse against anyone if adverse effects occurred because of your use.

If you read between the lines, you will recognize that the use of an unapproved drug or an approved one in an unapproved way will likely not get you into any trouble if it is used with a nonfood animal, because nobody really cares.

## PRESCRIPTION AND NONPRESCRIPTION DRUGS

Many common drugs, such as penicillin G, tylosin, tetracyclines of several types, and sulfas are available on a nonprescription or over-the-counter (OTC) basis. These are drugs the FDA considers safe for the producer to use without close supervision of a veterinarian. They are generally materials that leave no tissue residues or are considered to be relatively free from residue problems when used by producers if directions are followed. Drugs are labeled for OTC sale only if adequate instructions for a non-veterinarian can be printed on the label. Just because these drugs are readily available on the shelf of a drugstore or farm supply store doesn't mean that you can use them in any way you like. Once again, if residues are found, you are the one whom the FDA or some other agency will come looking for. You must be able to demonstrate that you used the drug according to label instructions.

Feed additives are normally approved or not approved by the USDA rather than the FDA. For example, chlortetracycline (Aureomycin) is approved as an over-the-counter feed additive. However, for sheep, monensin (Rumensin) is not approved as a feed additive, and a veterinarian cannot legally prescribe it for that purpose. Some feed additives such as selenium are regulated by the FDA, because they are subject to the so-called Delaney clause, legislation which requires FDA approval for any substance that is suspected of causing cancer under some conditions.

Many drugs are available only on the prescription of a veterinarian. All

prescription drugs must carry the following statement on the label: “CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.” Most of these are drugs that have a high potential for causing illegal residues or injuring the animal if used improperly. If you use prescription drugs that have been obtained from a veterinarian, be sure that you understand how to use them correctly. It is the veterinarian’s responsibility to instruct you to use them in a proper manner, but that doesn’t relieve you of the responsibility of fulfilling your part of the bargain — following the vet’s instructions.

If a veterinarian provides a prescription drug to a producer and makes a reasonable effort to explain the dosage, route of administration, withdrawal time, and other appropriate information, and if the drug is an approved one that is used in the manner stated on the label or package insert, then the vet is probably protected from a lawsuit if the drug doesn’t produce the desired results.

In addition, for a veterinarian to prescribe a drug there must be a veterinary/client relationship. Basically that means that a veterinarian is not supposed to prescribe a drug for use by any unknown person who walks into the office or phones. The veterinarian must take responsibility for making judgments about the needs of the animal, and the client must agree to follow the instructions. The veterinarian must either examine the animal(s) or have sufficient personal knowledge of the keeping and care of the animal(s). The veterinarian must also be available for follow-up examination if needed, or arrange some way for follow-up to be done by a competent, qualified person.

It is important to give the full course of treatment for as many days as recommended by the label or a veterinarian. Even if symptoms vanish, continue the full treatment. If there is no recommendation, continue treatment for one to two days after the symptoms cease to be seen.

### Off-Label Use

An exception to the rule on both OTC and prescription drugs is called “extra-label” or “off-label” use, which is using animal or human health products in ways not specified on the label—for example, at higher doses or in different species. Sheep are often treated by off-label drug use, because there are not enough sheep to justify the manufacturer paying for the long testing required for approval for use with sheep. Off-label drug use requires a veterinarian’s prescription. Drugs that are not approved for any animal or human use cannot be used off-label.

Off-label drug use is only allowed if the animal's health is threatened or if the animal is suffering. The use is only for treatment or preventive medicine. That means that off-label use is not allowed for purposes of production or reproduction. For example, extra-label drug use for purposes such as weight gain, feed efficiency, or milk production is not allowed.

As with prescription drugs, a valid veterinarian/client/patient relationship must be established. Also it must be determined that there is no approved drug labeled to treat the condition, or that treatment at the recommended dosage would not be effective. A record of any animal given extra-label treatment must be maintained by the producer for two years. The withdrawal time prior to marketing an animal or animal product for food purposes must be significantly extended, as determined by the veterinarian using scientific information. Extra-label drugs can be administered in drinking water, but not in feed. Finally, the drugs should be stored in an appropriate manner as indicated on the label or by the veterinarian. Note that some drugs are not to be kept refrigerated.

## UNAPPROVED DRUGS

Drugs are approved for a specific type of use for a specific species, and any other use is unapproved, by definition. However, there is a large class of substances that are called Generally Recognized as Safe (GRAS) that includes common things like table salt, sugar, vinegar, and a lot of drugstore items such as sodium bicarbonate, calcium carbonate, ascorbic acid, common vitamins, many mineral supplements, and the like. A long list of GRAS materials that are commonly added to feed is published by the FDA. The GRAS list includes most inorganic materials that are added to sheep and lamb feeds. A notable exception is ammonium chloride, which is added to lamb feeds to prevent urinary calculi. Ammonium chloride, contrary to widespread belief of many feed-mill operators and veterinarians, is an approved additive for sheep feeds. Selenium and its compounds are not on the GRAS list either, but sodium selenite or sodium selenate is an approved feed additive for sheep. Approval in this case is by the FDA, because selenium is on a list of chemicals that are treated as drugs by legislation—the Delaney clause again.

Many other materials are approved for one or more species, but not for sheep. Because of this, sheep producers are constantly tempted to use unap-

proved drugs for treatment of sheep and lambs. A big problem is that neither the safety nor the effectiveness of a given drug for sheep may be known. Just because something is safe and effective for a cow doesn't mean that it is for a sheep.

A recent law, effective in late 2000, would allow pharmaceutical companies to more easily obtain label approval for sheep, by using test results from other species. The bill would, among other things, provide tax incentives to drug companies and extend periods of market exclusivity to lower the cost of the approval process. One hopes that this means more drugs will be available for OTC or prescription use with sheep, and off-label use of said drugs will not be needed.

There are various informal ways of testing drugs, of course. These can range from your getting advice from your neighbor who was a grade-school dropout and who hasn't washed a hypodermic syringe in thirty years, to a veterinarian's getting advice from other veterinarians who have made informal clinical trials of a drug. If you believe something that your neighbor tells you, you'll have to do it taking into account your opinion of your neighbor, and with the understanding that you are taking more or less of a chance. You may end up with a dead animal, or the FDA representative ringing your doorbell, and you'll have not a leg to stand on.

On the other hand, a veterinarian has access to published reports by other veterinarians and researchers in animal health. The studies he reads may not be as exacting as those demanded by the FDA for approval, but they represent controlled research by qualified persons. Not only that, a veterinarian has training and experience as a guide in using an unapproved drug or using an approved one at an unapproved dosage or other variation.

If you want to use injectable levamisole instead of a drench or to use a paste-type horse wormer, get your vet to prescribe it. You may find occasionally that your veterinarian hesitates to prescribe or use an unapproved drug. While a vet is within his legal rights to use an unapproved drug or an approved one in an unapproved manner, he is also held responsible for any illegal residues found in food produced by the animal treated. The veterinarian can also be held responsible by the animal's owner and may be subject to civil (malpractice) suits. In other words, the owner of the animal gets off the hook, but the hapless vet is stuck with blame from all quarters.

## DISAPPROVED DRUGS

There are a few drugs that are forbidden by the FDA because they are known to have safety hazards. Any product containing these substances is subject to regulatory action when found in interstate commerce. (The FDA, a federal agency, has authority to regulate only when a product is sold across state lines.) Also, some drugs that were approved at one time have had approval withdrawn when new evidence of their harmful effects appeared later. The use of diethylstilbestrol (DES) implants is a good example.

The following drugs are prohibited in food-producing animals under any circumstances: Chloramphenicol, Clenbuterol, Diethylstilbestrol (DES), Dimetridazole, Fluroquinolones (except as specifically approved), Furazolidone (except topical), Iprnidazole, Glycopeptides, Nitrofurazone (except topical), Sulfonamides in lactating dairy animals, except those specifically approved.

Another point about questionable drugs is that the FDA has no way to require that it be allowed to review drugs before they are put on the market. Because of this loophole in the law, it is sometimes years before a given drug comes to the FDA's attention. Once they know about a drug and determine that it is not in the GRAS category or previously approved, then they can require the paperwork to show the drug's safety and effectiveness. It may be assumed that there are drugs on the market which the FDA would not approve of if they knew about them. For this reason you should be suspicious of a drug that you've never heard of, perhaps made by a small manufacturer. Someone may be selling "snake oil" for sheep that was made in a basement or garage. It may be useless or even harmful, but the manufacturer can get away with selling it until the FDA gets wind of the operation, at which time the business may just fold and vanish. A New Jersey veterinarian was taken to court by the FDA for selling antibiotic mixtures by mail to veal farmers in a number of states even though the veterinarian had never examined the animals and the drug mixtures were not approved. Even a vet can be in the present-day patent medicine business until he's caught.

For additional information check out [www.fda.gov/cvm/](http://www.fda.gov/cvm/). See also [www.saanendoah.com/](http://www.saanendoah.com/) for some excellent information about drugs and many other aspects of goat health that can be applied to many sheep situations.

## WEIGHTS AND MEASURES

Weights and measure with medications are often given in metric terms. Here are some helpers.

*Approximate household measure equivalents:*

1 teaspoon (tsp) = 5 ml (cc)

1 Tablespoon (Tbsp) = 15 ml (ca. 3 teaspoons), or  $\frac{1}{2}$  oz

1 ounce (oz.) = 30 ml (ca. 2 Tablespoons)

1 cup = 16 Tablespoons = 240 ml

1 liter (l) = 1,000 ml (cc) or 1.06 quarts

Doses for many medications and supplements are written in kilograms (kg) animal weight.

*Some metric equivalents:*

1 kg (1,000 grams) equals 2.2 pounds

1 pound = 0.454 kg, or 454 grams

3 standard adult aspirin tablets weigh approx. 1 g

1 mg = 1,000 ug or mcg (ug & mcg = micrograms)

1,000 mg = 1 gram (g)

1 ml (milliliter) is equivalent to 1 cc (cubic centimeter)



## APPENDIX 4

### Sheep Economics

**A**ny endeavor, whether a hobby or a full-scale business, involves expenses, and it may sometimes bring in revenue. Raising sheep can produce income greater than expenses if a lot of things are done with foresight and intelligence. If a profit motive is not part of why you want to raise sheep, stop reading here. If you are curious, read on.

To decide whether sheep raising is something you want to get into, you should look at the costs involved and the potential for sales of your products: lambs, wool, and sheep. To some extent, the potential for profit is a function of what other income a sheep raiser has, because what might be an unacceptable expense to one person could be a tax shelter to another.

### TAXATION

I will assume that you readers are not raising sheep as a corporation, but as individuals. In that situation, your expenses and income from the sheep enterprise are mixed with your personal tax obligations.

Any profits from the sheep become part of your gross income for income tax purposes. Profits from sheep, or any other self-run business, are added to any salary or other taxable income that you may have. Losses can also be subtracted—up to a vague point. In addition, bona fide farmers have a number of income tax advantages, not the least of which is relaxation of requirements for paying estimated tax in advance quarterly payments.

In addition, there may be property tax obligations that relate to your raising sheep. In some states you may pay tax on the sheep! On the other hand, you may have vastly reduced property taxes if you are a farmer and live on that farm.

I'll zip through these two subjects quickly, and suggest that you seek professional help if you don't sing along easily.

### Income tax

In the sheep (or any) business there are expenses and receipts. The difference between the two is profit, and the profit is the taxable part that should be looked at with care and imagination.

First the bad news—land you own is not an expense as far as the tax authorities are concerned until you sell it, at which point the income from the sale can be reduced by the amount the land cost you. If you pay rent to use land, that is a current expense, and if you receive rent, that is current income. Property taxes on the land are normally a business expense. Sales of lambs, sheep, wool, or any other product are counted as income.

Expenses include almost everything you pay money for to support your sheep farm. The list is endless. Obvious things such as feed, veterinary, fuel, insurance, seed, and hired help are ordinary expenses. Farm-related telephone and vehicle use are deductible too. Cost of buildings, fences, and tractors may have to be treated differently. However, any sheep-raising expense can be subtracted from your receipts in some way.

In addition, some sales of livestock can be taxed as capital gains instead of ordinary income, making the taxation rate lower. You may be able to obtain tax credits on some of your investments in buildings and equipment.

Consult with a tax advisor with some experience in income tax for farmers. This does not just mean a tax preparer who happens to live and work in a farming community; it means someone who understands all the minutia and tricks of farm taxes.

## Profit Making

In order to use business deductions from a sheep-raising operation, you must be able to demonstrate to the Internal Revenue Service (IRS) that you are engaged in the activity with the intention of making a profit. The clearest proof is to make a profit every year. If you can't do that, then try to make a profit for two years out of five. If you still can't do that, then maybe you should get a bookkeeper who will be able to make the books show a profit two years out of five, even if you didn't really do it. That can often be arranged by adjusting in which tax year you buy and sell. This is known as creative accounting and can be totally legal.

If you still can't show a profit, then you must be able to demonstrate to the IRS that you have made a reasonable effort to make a profit, even though you failed to do so. If your sole source of income is farming, then it can be simply assumed that you are trying to make a profit. If you have income of some sort other than from farming, then you will have to prove that the sheep business is more than a hobby. You do this by being able to show that you have tried to be a good manager, that you are improving your knowledge, and are

consulting experts and changing methods that have proven not to be profitable in the past, and similar activities. The fact that you are reading this book would be a piece of such evidence. Not only that, you can deduct the cost of the book as a business expense.

Enough of this—see that tax advisor with experience in income tax for farmers.

## Fixed Costs

Some costs of raising sheep are called fixed costs. Why fixed? Because they are costs that don't change much from year to year or with the number of sheep one owns.

Important fixed costs are land, fences, buildings, and much equipment. Land is a one-time cost, and in general it doesn't deteriorate in value over time. Most other fixed costs change with time, because the item gets old and worn out. A fence is a fixed cost, but after some time period it will have to be replaced, so it declines in value. A convenient way to fit fixed costs into a budget is to estimate how much money you could earn from the fixed cost if you invested the money somewhere. Use current interest rates to do your figuring. As I write this, one can get about 6 percent interest on conservative investments. So, if you pasture your sheep on 40 acres of land that you paid \$500 an acre for, then your annual cost is  $40 \times \$500 \times 0.06 = \$1,200$ . Going one step further, if you have 200 adult ewes on the pasture, the annual cost is  $\$1,200/200 = \$6$  per ewe.

Of course you should have a fence around the pasture, and some cross fencing within the 40 acres too. Your cost for that could be about \$2,000, allowing some extra for maintenance and loss of interest over a life of twenty years. So that is \$100 per year or \$0.50 per ewe.

If you have a barn for lambing, that might cost you \$5 a square foot for a 1,600-square-foot simple, basic barn or \$8,000. Again over 20 years the cost per ewe will be  $\$8,000/20/200 = \$2$  per ewe, ignoring the \$0.25 in lost interest.

All the above come to \$8.50 per ewe per year. One should allow for some other fixed costs, so round up by another \$0.50 per ewe per year to give a total of \$9 per ewe per year.

The ewe has a cost of course. Let's say you pay \$100 per ewe, and then sell her for \$20 after seven years. You lose \$6 interest a year, so the annual cost per ewe is  $\$6 + (\$80/7) =$  about \$18.

There is a ram cost, but a ram can breed up to 50 ewes a year with ease, so his cost will be less than \$1 per ewe. Veterinary and drug costs are typically about \$2.50 a year per ewe.

The sheep will eat from the pasture for half the year, but assuming six months of hay and some grain at critical times figure 600 pounds of hay at \$0.03 per pound and 250 pounds of grain at \$0.05 a pound for a total feed cost of \$30.50 per ewe per year.

So we have:

Land, fencing, housing	\$9.00
Feed	\$30.50
Ewe cost	\$18.00
Ram cost (per ewe)	\$1.00
Health	\$2.50
Other	\$1.00
Total per ewe per year	\$62.00

That ewe will produce about 8 pounds of wool a year. In the present wool market, the value of the wool may not pay for the shearing, so that could be a loss. If one raises sheep that produce premium, niche market wool, then the wool can be worth \$4–\$8 a pound after throwing away the dirty or spoiled parts, leaving 6 pounds or \$24–\$48 a fleece. However, shearing will cost \$2–\$6, and marketing will also be costly in both time and cash outlays for advertising or travel to direct markets. For this discussion I will just avoid the wool value entirely as it is subject to too many variables.

However, that ewe will also have lambs that can be marketed, and that is where the profit comes in. To look at that part of the spectrum, one must convert to cost per lamb. The cost per lamb depends on how many lambs a ewe births. Here are some possibilities.

number of lambs/ewe	cost per lamb at birth
1	\$62.00
1.5	\$41.33
2	\$31.00
2.5	\$24.80
3	\$20.66

A lamb will eat some creep feed prior to weaning, perhaps averaging a pound a day over an eight-week period, for 56 pounds at \$0.06 or \$3.36. After

weaning it should gain a pound on four pounds or less of grain. Assuming a light weaning weight of 50 pounds, to gain an additional 60 pounds would take 240 pounds of feed at \$0.06 or \$14.40 per lamb plus the preweaning \$3.36 to give a total lamb feed cost of \$17.76. You'd have to use local prices for feed to have this figure mean anything for your flock.

Using the above figures, which would be typical for the midwestern USA, we get the following. I have approximately corrected the feed costs for the heavier birth weights of the single, 1.5, and 2 lamb births. The correction is about \$0.25 per pound of lamb.

lambs/ewe	feed to 110 pounds	cost per lamb
1	\$17	\$79.00
2	\$18	\$49.25
3	\$19	\$39.66

Let's assume a conservative \$0.70 a pound for market lambs, and I will ignore marketing costs. Then the income per ewe and net profit would be as follows:

lambs/ewe	cost of all of a ewe's lambs	value of all of a ewe's lambs	net profit per ewe
1	\$79.00	\$77.00	(-\$2.00)
2	\$98.50	\$154.00	\$55.50
3	\$118.98	\$231.00	\$112.02

I have not figured labor into any of the above calculations.

Why would anyone raise sheep that produced an average of one lamb per ewe? That's a good question. However, in a range operation the cost of land, feed, and housing is greatly reduced, and the total number of sheep is much larger than in a farm flock. The actual budget for one large ranch in New Mexico shows a total cost of \$38.59 per ewe, including rental of pasture, feed, vet, interest, and everything else. So that operation would show a tidy profit with single lambs.

At the other end, a flock averaging three lambs per ewe will require a great deal more labor and skill from the shepherd, and would not be a good thing at all for inexperienced people. Also, with that many lambs the cost of labor begins to become very significant. A part-time farmer would probably have to hire help, increasing costs.

Calculations by Janet McNalley, a leading Minnesota producer and consultant, show that the most profitable range of lambing percentages is in the 180 to 225 percent range for average sheep and average shepherds. With prolific sheep who are also good milkers and mothers, and with skilled shepherding, higher lambing levels are very practical.

If one can sell breeding stock, maybe even a few expensive purebreds, and also find a good niche market for specialty wool, then the margins go up too.

## MILK SHEEP

A small but growing niche market is sheep milk and cheese. There is a good book on the subject by Olivia Mills (see appendix 6), and there is a good booklet available from the Alfa Laval company called "Systems Solutions for Dairy Sheep." There is a big investment in housing and milking equipment, and planning is essential. As with milking cows, milking sheep is a seven-day-a-week job. Before planning or building any facilities, be sure to check with your state's milk inspectors to find what the requirements are. No matter what the regulations, you will need lots of water (both cold and hot), a sewage system, a bulk tank with cooling, and a place to wash equipment. You will also need facilities for storing milk in a large freezer to accumulate a large enough quantity to ship to a cheesemaker or other buyer.

The breed of choice is the East Friesian (or Friesland), and there are sheep with East Friesian bloodlines available in the United States. The problem is that East Friesian sheep cannot be imported from their homelands in Europe for health reasons, but there are sources in New Zealand and Australia for importable sheep, embryos, and semen. A recommended source for information is Dr. Martin Dally at the University of California, Davis. His email address is [mrdally@ucdavis.edu](mailto:mrdally@ucdavis.edu). This is a developing field, so check current magazines for new information. Also check [www.sheepdairying.com](http://www.sheepdairying.com) and [olivia\\_mills@msn.com](mailto:olivia_mills@msn.com).

## CAVEATS

So get out a pad and pencil, or fire up the spreadsheet software, and start experimenting with numbers before you buy the sheep, or even the land.

Don't forget, be sure that there is a market for your lambs in your area or

region before you embark on raising lambs. Transporting lambs to a distant marketing point can wipe out profits with the flick of a pen on a hauling contract. Even if you have a convenient market, check out all the marketing costs and take them into account—which I did not in the material above. The same applies to wool, milk, or any other product from your sheep farm.



## APPENDIX 5

### Nutritional Requirements

Sheep and lambs require water, a source of energy, a source of protein, and small amounts of vitamins and minerals. In most parts of the world, a pasture with a stream or pond will meet all of a sheep's nutritional needs, especially if a thoughtful shepherd has provided some salt with minerals in it. Requirements are very different at different times of the year, and a shepherd who pastures sheep year-round has to manage grazing in such a way as to prevent sheep obesity at some times and their near starvation at others. Requirements depend largely on the stage of the ewes' reproductive cycles. Where stored feed is used for part of the year, the amounts fed must be adjusted to suit the cyclic needs of ewes.

Water must always be in adequate supply or it will be a limiting factor in the whole nutritional picture. The same is true for minor and trace minerals and for vitamins, especially vitamins A and E that can be in short supply when inferior stored feed is used at some seasons. Recommendations for appropriate levels of vitamins and minerals are given in the tables that follow.

When most shepherds speak of nutrition they are referring to the energy and protein provided by feedstuffs such as hay, grass, and grain. The basic information about the gross nutritional needs of sheep, as well as the composition of common feeds, has been gathered into a book, *Nutrient Requirements of Sheep*, published by the National Research Council (NRC). The current sixth edition was published in 1985. Some tables from the book are reproduced here for your convenience (see tables 1 to 4 in this appendix), but I strongly recommend that you buy the whole booklet too, because it contains much more useful material than can be reproduced here. You can purchase or read the book on-line—see appendix 6. Please note that the tables are presented mostly in metric weights: kilograms and grams. In the sample calculations, I will convert from metric to English. The basic conversion factors are 1 kilogram (kg) = 2.2 pounds, 1 pound = 454 grams (g), 1 ounce = 28.4 g.

## ENERGY

The energy requirements of sheep are that fraction of nutrient needs that is measured in calories, with table values given in millions of calories or Mcal. Unlike humans in developed countries, sheep generally receive insufficient energy rather than insufficient protein, in cases in which any dietary deficit is present. The energy content of feeds is given in terms of total digestible nutrients (TDN) or in energy units in Mcal.

The optimal levels of energy that a sheep requires depend on a number of factors, including air temperature, availability of shelter, age and sex, stage of the ewe's cycle, and general health. The NRC tables take some of these factors into account. The shepherd will have to use judgment and experience for other factors not tabulated.

A sheep that does not receive sufficient energy will lose body weight and fat, stop growing, produce less wool and milk, and be more susceptible to disease than an adequately nourished sheep. A pregnant ewe that does not get sufficient energy will give birth to premature and/or weak lambs, and the lambs will have a poor survival rate. A ram that does not get enough feed energy will not have the stamina or interest to get out and breed enough ewes to earn his keep, and the ewes will have low conception rates even if bred.

A ewe that receives too much energy will not be as fertile, may have difficult births because of oversized lambs and her own extra fat, will be more susceptible to vaginal prolapse during late gestation, will produce less milk when lactating, will readily go off feed from indigestion, and will be much more susceptible to a variety of diseases than her less portly sister. An overfed ram will simply not be fit enough to get out and do his job without getting pooped.

The commonest concentrated energy feed is grain, although pasture, hay, and root crops can provide lots of calories too. A situation to avoid is feeding a material, straw, for example, that is too low in TDN relative to its volume. A sheep in some cases cannot consume enough material to meet its minimum needs. Silage can pose a similar problem if high water content keeps a sheep from eating enough to meet peak needs. Just plain palatability can also be a problem with spoiled, moldy, or weedy hay.

## PROTEIN

As with energy needs, protein requirements are easily met by quality pasture or good hay. Except for really poor feeds, the protein requirements are almost

automatically satisfied if energy needs are met. This statement should not be taken literally to the extent that protein needs are ignored because some feeds are practically all energy and almost no protein. Protein requirements of lambs are vastly higher than those of older ewes, so consider age and stage in the reproductive cycle.

Feeds such as soybean meal, sunflower seed meal, rapeseed (canola) meal, and similar products are very high in protein, and are usually used to blend high protein lamb feeds. Good quality legume hay will average 12 to 16 percent protein, far more than sufficient for an adult ewe at any stage in her cycle. Grains, as mentioned, are primarily energy feeds and have only around 8 to 10 percent protein for common feed types. Urea, a nonprotein chemical that contains nitrogen, is sometimes used as a nitrogen source to increase the effective protein content of mixed feeds, because the rumen flora can convert small proportions of it into protein building blocks. It is very tricky to use, and poor mixing can make a portion of the feed deadly to ewes eating it. In any case, no more than one-third of the total "protein" can be in the form of urea, and it can be fed only to functional ruminants. Young lambs, less than a month old or so, cannot utilize urea at all, and will be sickened or killed by it.

The emphasis on protein in human diets leads some sheep producers to be overly concerned with it. Sheep convert protein in feed into protein in their own bodies insofar as it is needed. Any excess protein has to be converted into metabolizable energy for the sheep to be able to use it. This is a losing proposition because the sheep must use up energy in order to convert the extra protein to energy, a sort of robbing Peter to pay Paul situation. The economy-minded shepherd should be sure to feed enough protein, but avoid overfeeding it, because it is utilized very inefficiently as a source of energy. You will find when you calculate some rations that it is sometimes difficult to devise a mix that is low enough in protein.

## MINERALS

Calcium and phosphorus are the main minerals required by sheep in terms of quantity. The calcium and phosphorus should be in a ratio of about 2:1 (Ca:P) and should total about 0.5 percent of the whole diet. Legumes are generally very high in calcium relative to phosphorus, with cereal grains being the reverse. Grass hays are intermediate. Sheep can tolerate high Ca:P ratios, up to six or seven to one, but the reverse is not true.

Sodium is usually adequate in ordinary feed, and in any case is provided amply in salt given free choice. Some self-styled experts say there is no need for supplemental salt for sheep, but try telling that to your flock. Whether they need it or not is a moot point because they surely do like it. As I mentioned in chapter 7, adequate sodium from salt is essential for lactation. Trace minerals are easily provided by free choice TM salt as long as copper toxicity is not a problem. Never mix a copper-containing mineral salt with feed, because the sheep may consume a toxic amount.

## CALCULATING RATIONS

There are many computer programs (software) for calculation of livestock rations. Depending on the sophistication of the software, the final ration may be a minimum-cost mixture of a large number of components or just a balanced blend of two or three materials.

For most purposes, simple ration calculations can be done with a pencil and paper and a pocket calculator. I will give a couple of examples to get you started.

### Example 1—Calculating a Ration from Available Hay and Grain for a 70 kg (154 lb.) Ewe in Late Gestation Carrying Twins

Available feeds are a grass hay and shelled corn that have analyses as listed below, with protein, digestible energy (DE), Ca, P on a dry basis.

Check the following table, keeping in mind that a 70 kg ewe in late gestation requires 5.4 Mcal of DE, 214 g protein, 7.6 g Ca, and 4.5 g P.

#### Feed Analyses

	% Dry Matter	% Protein	DE, Mcal/kg	% Ca	% P
Grass hay	90	8.1	2.47	0.34	0.21
Shelled corn	85	10.0	4.05	0.02	0.32

The ewe will be able to eat about 2 percent of her body weight in hay with ease, or 1.4 kg (roughly 3 pounds). The 1.4 kg of hay will provide  $1.4 \times 2.47 = 3.46$  Mcal on a dry basis. Since the hay is 90 percent dry matter, the energy of 1.4 kg becomes  $3.46 \times 0.90 = 3.11$  Mcal.

## NUTRITIONAL REQUIREMENTS

The ewe requires 5.4 Mcal, so the corn will have to supply  $5.40 - 3.11 = 2.29$  Mcal. The corn contains 4.05 Mcal/kg, so the ewe needs  $2.29 / 4.05 = 0.56$  kg. Since the corn contains only 85 percent dry matter, we should divide by 0.85 to get 0.66 kg (about 1.5 pounds) of corn as fed.

Her energy requirements then will be met by 3 pounds of the hay and 1.5 pounds of the corn.

The protein in the ration will be:

Hay	1.4 kg	$\times 0.081$	$\times 1,000$	$\times 0.90 =$	102 g
Corn	0.66 kg	$\times 0.100$	$\times 1,000$	$\times 0.85 =$	<u>56 g</u>
Total protein =					158 g

The ewe needs 214 g of protein, so she is  $214 - 158 = 56$  g short. This deficit can be provided out of a bag by feeding some soybean meal along with the corn. Soybean meal contains about 46 percent protein as fed, so  $56 / 0.46 = 122$  g or a little more than four ounces. Perhaps a simpler route might be to feed a higher protein hay since even a 12 percent protein hay would make up the protein need.

Calcium provided by the basic ration will be:

Grass hay	1.4 kg	$\times 0.90$	$\times 0.34\% \text{ Ca}$	$\times 1,000 =$	4.28 g Ca
Shelled corn	0.66 kg	$\times 0.85$	$\times 0.02\% \text{ Ca}$	$\times 1,000 =$	<u>0.11 g Ca</u>
Total Ca					= 4.39 g

A similar calculation for phosphorus gives total P = 4.4 g.

The slight deficit in phosphorus would be easily provided for by giving the ewe free-choice access to a 1:1 salt and dicalcium phosphate mixture. Dicalcium phosphate contains almost 19 percent P, so the mixture would contain about 9 percent P. Typical daily consumption of salt mixes is 10–15 g, and even 10 g would provide 1.2 g Ca and 0.9 g P. The dicalcium phosphate could be mixed with the grain at the rate of 5 g per ewe if desired.

The calcium deficit could be provided by feeding alfalfa hay or by adding ground feed-grade limestone (33 percent Ca) to the grain at 10 g per ewe. The ewe is getting 0.66 kg of corn so the 10 g of limestone would be 1.5 percent of the total grain mixture, or 30 pounds per ton of corn.

A ewe carrying triplets should be fed more, but not so much as to make her put on fat (perhaps 10 percent additional TDN).

### Example 2—Calculating a Lamb Grain Ration with 14 Percent Protein Using Corn and Soybean Meal with, Respectively, 9 Percent and 46 Percent Protein as Fed

To solve this problem, simply calculate the difference between the protein content of each ingredient and the desired total protein content of the mix, without regard to algebraic sign.

	% Protein	Desired % Protein	Difference
Corn	9	14	5
Soybean meal	46	14	32

The value of the difference is the proportion of the *other* ingredient. Thus the desired proportions of corn and soybean meal to give a 14 percent mixture are 32 parts corn and 5 parts soybean meal. In percentage terms that would be corn 86 percent, soybean meal 14 percent; or a ton of feed could be made of 1,720 pounds of corn and 280 pounds of soybean meal. Rounding down or up to the nearest hundred pounds of each component will give:

Corn	Soybean Meal	%Protein
1,700	300	14.6
1,720	280	14.0
1,800	200	12.7

The calcium and phosphorus requirements of young and growing lambs are most important and should be considered. A 40 kg (88 lb.) ewe lamb requires 5.9 g Ca and 2.6 g P.

Each kg of the corn-soybean meal mixture will contain:

	%	Ca	P
Corn	86	$0.86 \times 0.02\%$ $\times 1,000 = 0.17\text{g}$	$0.86 \times 0.32\%$ $\times 1,000 = 2.75\text{g}$
Soybean meal	14	$0.14 \times 0.36\%$ $\times 1,000 = 0.50\text{g}$	$0.14 \times 0.75\%$ $\times 1,000 = 1.05\text{g}$
		Total Ca 0.67g	Total P 3.80g

A kilogram of the ration (2.2 lb.) will easily provide the required phosphorus but is markedly deficient in calcium. In addition, the Ca:P ratio should be around 2:1 as a preventive measure against urinary calculi. Addition of 1 percent calcium carbonate (limestone) will add 3.4 g/kg of calcium to give a total

of 4.07 g/kg. Addition of 2 percent limestone will bring the ratio to almost 2:1, as well as providing 6.8 g/kg additional calcium.

The calcium can also be provided by an alfalfa hay with 1.3 percent calcium. To provide the same 6.8 g as the ground limestone would do, the lamb will have to eat  $6.8 / 0.013 = 523$  g (over a pound) of hay for each kilogram of the grain-meal mixture. This is not at all unreasonable, except that the limestone is still cheap insurance against a low Ca:P ratio for the lamb that finds the corn and soymeal mixture more to its liking and eats little or no hay. Getting extra calcium from the hay will do no harm, so providing the appropriate ratio in the concentrated feed is a reasonable thing to do.

**Table 1** Daily Nutrient Requirements of Sheep

Weight		Dry Matter per Animal <sup>a</sup>		Nutrients per Animal						Vitamin A	Vitamin E						
Body Weight Change/Day				Energy <sup>b</sup>		Crude protein		Ca	P	Activity (IU)	Activity (IU)						
(kg)	(lb.)	(g)	(lb.)	(kg)	(lb)	DE (Mcal)	ME (Mcal)	(g)	(g)								
		(% body weight)		TDN													
<b>Ewes<sup>c</sup></b>																	
<b>Maintenance</b>																	
50	110	10	0.02	1.0	2.2	2.0	2.0	0.55	1.2	2.4	2.0	95	0.21	2.0	1.8	2,350	15
60	132	10	0.02	1.1	2.4	1.8	2.2	0.61	1.3	2.7	2.2	104	0.23	2.3	2.1	2,820	16
70	154	10	0.02	1.2	2.6	1.7	2.4	0.66	1.5	2.9	2.4	113	0.25	2.5	2.4	3,290	18
80	176	10	0.02	1.3	2.9	1.6	2.6	0.72	1.6	3.2	2.6	122	0.27	2.7	2.8	3,760	20
90	198	10	0.02	1.4	3.1	1.5	2.8	0.78	1.7	3.4	2.8	131	0.29	2.9	3.1	4,230	21
<b>Flushing—2 weeks prebreeding and first 3 weeks of breeding</b>																	
50	110	100	0.22	1.6	3.5	3.2	3.4	0.94	2.1	4.1	3.4	150	0.33	5.3	2.6	2,350	24
60	132	100	0.22	1.7	3.7	2.8	3.6	1.00	2.2	4.4	3.6	157	0.34	5.5	2.9	2,820	26
70	154	100	0.22	1.8	4.0	2.6	3.8	1.06	2.3	4.7	3.8	164	0.36	5.7	3.2	3,290	27
80	176	100	0.22	1.9	4.2	2.4	4.0	1.12	2.5	4.9	4.0	171	0.38	5.9	3.6	3,760	28
90	198	100	0.22	2.0	4.4	2.2	4.2	1.18	2.6	5.1	4.2	177	0.39	6.1	3.9	4,230	30
<b>Nonlactating—First 15 weeks gestation</b>																	
50	110	30	0.07	1.2	2.6	2.4	2.4	0.67	1.5	3.0	2.4	112	0.25	2.9	2.1	2,350	18
60	132	30	0.07	1.3	2.9	2.2	2.6	0.72	1.6	3.2	2.6	121	0.27	3.2	2.5	2,820	20
70	154	30	0.07	1.4	3.1	10	2.8	0.77	1.7	3.4	2.8	130	0.29	3.5	2.9	3,290	21

**Table 1** Continued

80	176	30	0.07	1.5	3.3	1.9	0.82	1.8	3.6	3.0	139	0.31	3.8	3.3	3,760	22
90	198	30	0.07	1.6	3.5	1.8	0.87	1.9	3.8	3.2	148	0.33	4.1	3.6	4,230	24
Last 4 weeks gestation (130 – 150% lambing rate expected) or last 4–6 weeks lactation suckling singles <sup>d</sup>																
50	110	180 (45)	0.40 (0.10)	1.6	3.5	3.2	0.94	2.1	4.1	3.4	175	0.38	5.9	4.8	4,250	24
60	132	180 (45)	0.40 (0.10)	1.7	3.7	2.8	1.00	2.2	4.4	3.6	184	0.40	6.0	5.2	5,100	26
70	154	180 (45)	0.40 (0.10)	1.8	4.0	2.6	1.06	2.3	4.7	3.8	193	0.42	6.2	5.6	5,950	27
80	176	180 (45)	0.40 (0.10)	1.9	4.2	2.4	1.12	2.4	4.9	4.0	202	0.44	6.3	6.1	6,800	28
90	198	180 (45)	0.40 (0.10)	2.0	4.4	2.2	1.18	2.5	5.1	4.2	212	0.47	6.4	6.5	7,650	30
Last 4 weeks gestation (180 – 225% lambing rate expected)																
50	110	225	0.50	1.7	3.7	3.4	1.10	2.4	4.8	4.0	196	0.43	6.2	3.4	4,250	26
60	132	225	0.50	1.8	4.0	3.0	1.17	2.6	5.1	4.2	205	0.45	6.9	4.0	5,100	27
70	154	225	0.50	1.9	4.2	2.7	1.24	2.8	5.4	4.4	214	0.47	7.6	4.5	5,950	28
80	176	225	0.50	2.0	4.4	2.5	1.30	2.9	5.7	4.7	223	0.49	8.3	5.1	6,800	30
90	198	225	0.50	2.1	4.6	2.3	1.37	3.0	6.0	5.0	232	0.51	8.9	5.7	7,650	32
First 6–8 weeks lactation suckling singles or last 4–6 weeks lactation suckling twins <sup>d</sup>																
50	110	–25 (90)	-0.06 (0.20)	2.1	4.6	4.2	1.36	3.0	6.0	4.9	304	0.67	8.9	6.1	4,250	32
60	132	–25 (90)	-0.06 (0.20)	2.3	5.1	3.8	1.50	3.3	6.6	5.4	319	0.70	9.1	6.6	5,100	34
70	154	–25 (90)	-0.06 (0.20)	2.5	5.5	3.6	1.63	3.6	7.2	5.9	334	0.73	9.3	7.0	5,950	38
80	176	–25 (90)	-0.06 (0.20)	2.6	5.7	3.2	1.69	3.7	7.4	6.1	344	0.76	9.5	7.4	6,800	39
90	198	–25 (90)	-0.06 (0.20)	2.7	5.9	3.0	1.75	3.8	7.6	6.3	353	0.78	9.6	7.8	7,650	40

**Table 1** Daily Nutrient Requirements of Sheep (continued)

Weight Change/Day		Dry Matter per Animal <sup>a</sup>		Nutrients per Animal											
Body Weight	Change/Day	(lb.)	(g)	(lb.)	(kg)	(% body weight)	Energy <sup>b</sup>	Crude protein	Ca	P	Vitamin A	Vitamin E			
(kg)	(lb.)	(g)	(lb.)	(kg)	(lb)	(Mcal)	TDN (kg)	(lb)	(g)	(g)	(IU)	(IU)			
First 6–8 weeks lactation suckling twins															
50	110	-60	-0.13	2.4	5.3	4.8	1.56	3.4	6.9	5.6	0.86	10.5	7.3	5,000	36
60	132	-60	-0.13	2.6	5.7	4.3	1.69	3.7	7.4	6.1	0.89	10.7	7.7	6,000	39
70	154	-60	-0.13	2.8	6.2	4.0	1.82	4.0	8.0	6.6	0.92	11.0	8.1	7,000	42
80	176	-60	-0.13	3.0	6.6	3.8	1.95	4.3	8.6	7.0	0.96	11.2	8.6	8,000	45
90	198	-60	-0.13	3.2	7.0	3.6	2.08	4.6	9.2	7.5	0.99	11.4	9.0	9,000	48
Ewe lambs															
Nonlactating—First 15 weeks gestation															
40	88	160	0.35	1.4	3.1	3.5	0.83	1.8	3.6	3.0	0.34	5.5	3.0	1,880	21
50	110	135	0.30	1.5	3.3	3.0	0.88	1.9	3.9	3.2	0.35	5.2	3.1	2,350	22
60	132	135	0.30	1.6	3.5	2.7	0.94	2.0	4.1	3.4	0.35	5.5	3.4	2,820	24
70	154	125	0.28	1.7	3.7	2.4	1.00	2.2	4.4	3.6	0.36	5.5	3.7	3,290	26
Last 4 weeks gestation (100–120% lambing rate expected)															
40	88	180	0.40	1.5	3.3	3.8	0.94	2.1	4.1	3.4	0.41	6.4	3.1	3,400	22
50	110	160	0.35	1.6	3.5	3.2	1.00	2.2	4.4	3.6	0.42	6.3	3.4	4,250	24
60	132	160	0.35	1.7	3.7	2.8	1.07	2.4	4.7	3.9	0.42	6.6	3.8	5,100	26
70	154	150	0.33	1.8	4.0	2.6	1.14	2.5	5.0	4.1	0.43	6.8	4.2	5,950	27

**Table 1** Continued

Last 4 weeks gestation (130–175% lambing rate expected)																
40	88	225	0.50	1.5	3.3	3.8	0.99	2.2	4.4	3.6	202	0.44	7.4	3.5	3,400	22
50	110	225	0.50	1.6	3.5	3.2	1.06	2.3	4.7	3.8	204	0.45	7.8	3.9	4,250	24
60	132	225	0.50	1.7	3.7	2.8	1.12	2.5	4.9	4.0	207	0.46	8.1	4.3	5,100	26
70	154	215	0.47	1.8	4.0	2.6	1.14	2.5	5.0	4.1	210	0.46	8.2	4.7	5,950	27
First 6–8 weeks lactation suckling singles (wean by 8 weeks)																
40	88	-50	-0.11	1.7	3.7	4.2	1.12	2.5	4.9	4.0	257	0.56	6.0	4.3	3,400	26
50	110	-50	-0.11	2.1	4.6	4.2	1.39	3.1	6.1	5.0	282	0.62	6.5	4.7	4,250	32
60	132	-50	-0.11	2.3	5.1	3.8	1.52	3.4	6.7	5.5	295	0.65	6.8	5.1	5,100	34
70	154	-50	-0.11	2.5	5.5	3.6	1.65	3.6	7.3	6.0	301	0.68	7.1	5.6	5,450	38
First 6–8 weeks lactation suckling twins (wean by 8 weeks)																
40	88	-100	-0.22	2.1	4.6	5.2	1.45	3.2	6.4	5.2	306	0.67	8.4	5.6	4,000	32
50	110	-100	-0.22	2.3	5.1	4.6	1.59	3.5	7.0	5.7	321	0.71	8.7	6.0	5,000	34
60	132	-100	-0.22	2.5	5.5	4.2	1.72	3.8	7.6	6.2	336	0.74	9.0	6.4	6,000	38
70	154	-100	-0.22	2.7	6.0	3.9	1.85	4.1	8.1	6.6	351	0.77	9.3	6.9	7,000	40
Replacement ewe lambs <sup>e</sup>																
30	66	227	0.50	1.2	2.6	4.0	0.78	1.7	3.4	2.8	185	0.41	6.4	2.6	1,410	18
40	88	182	0.40	1.4	3.1	3.5	0.91	2.0	4.0	3.3	176	0.39	5.9	2.6	1,880	21
50	110	120	0.26	1.5	3.3	3.0	0.88	1.9	3.9	3.2	136	0.30	4.8	2.4	2,350	22
60	132	100	0.22	1.5	3.3	2.5	0.88	1.9	3.9	3.2	134	0.30	4.5	2.5	2,820	22
70	154	100	0.22	1.5	3.3	2.1	0.88	1.9	3.9	3.2	132	0.29	4.6	2.8	3,290	22

**Table 1** Daily Nutrient Requirements of Sheep (continued)

Weight Change/Day		Dry Matter per Animal <sup>a</sup>		Nutrients per Animal					Vitamin A Activity (IU)	Vitamin E Activity (IU)						
Body Weight (kg)	(lb.)	(g)	(lb.)	(% body weight)	TDN (kg)	(lb)	DE (Mcal)	ME (Mcal)	Crude protein (g)	(lb)	Ca (g)	P (g)				
<b>Replacement ram lambs<sup>e</sup></b>																
40	88	330	0.73	1.8	4.0	4.5	1.1	2.5	5.0	4.1	243	0.54	7.8	3.7	1,880	24
60	132	320	0.70	2.4	5.3	4.0	1.5	3.4	6.7	5.5	263	0.58	8.4	4.2	2,820	26
80	176	290	0.64	2.8	6.2	3.5	1.8	3.9	7.8	6.4	268	0.59	8.5	4.6	3,760	28
100	220	250	0.55	3.0	6.6	3.0	1.9	4.2	8.4	6.9	264	0.58	8.2	4.8	4,700	30
<b>Lambs finishing—4 to 7 months old<sup>f</sup></b>																
30	66	295	0.65	1.3	2.9	4.3	0.94	2.1	4.1	3.4	191	0.42	6.6	3.2	1,410	20
40	88	275	0.60	1.6	3.5	4.0	1.22	2.7	5.4	4.4	185	0.41	6.6	3.3	1,880	24
50	110	205	0.45	1.6	3.5	3.2	1.23	2.7	5.4	4.4	160	0.35	5.6	3.0	2,350	24
<b>Early weaned lambs—Moderate growth potential<sup>f</sup></b>																
10	22	200	0.44	0.5	1.1	5.0	0.40	0.9	1.8	1.4	127	0.38	4.0	1.9	470	10
20	44	250	0.55	1.0	2.2	5.0	0.80	1.8	3.5	2.9	167	0.37	5.4	2.5	940	20
30	66	300	0.66	1.3	2.9	4.3	1.00	2.2	4.4	3.6	191	0.42	6.7	3.2	1,410	20
40	88	345	0.76	1.5	3.3	3.8	1.16	2.6	5.1	4.2	202	0.44	7.7	3.9	1,880	22
50	110	300	0.66	1.5	3.3	3.0	1.16	2.6	5.1	4.2	181	0.40	7.0	3.8	2,350	22

**Table 1** Continued

Early weaned lambs—Rapid growth potential <sup>f</sup>																
10	22	250	0.55	0.6	1.3	6.0	0.48	1.1	2.1	1.7	157	0.35	4.9	2.2	470	12
20	44	300	0.66	1.2	2.6	6.0	0.92	2.0	4.0	3.3	205	0.45	6.5	2.9	940	24
30	66	325	0.72	1.4	3.1	4.7	1.10	2.4	4.8	4.0	216	0.48	7.2	3.4	1,410	21
40	88	400	0.88	1.5	3.3	3.8	1.14	2.5	5.0	4.1	234	0.51	8.6	4.3	1,880	22
50	110	425	0.94	1.7	3.7	3.4	1.29	2.8	5.7	4.7	240	0.53	9.4	4.8	2,350	25
60	132	350	0.77	1.7	3.7	2.8	1.29	2.8	5.7	4.7	240	0.53	8.2	4.5	2,820	25

<sup>a</sup>To convert dry matter to an as-fed basis, divide dry matter values by the percentage of dry matter in the particular feed.

<sup>b</sup>One kilogram TDN (total digestible nutrients) = 4.4 meal DE (digestible energy); ME (metabolizable energy) = 82% of DE. Because of rounding errors, values in Table 1 and Table 2 may differ.

<sup>c</sup>Values are applicable for ewes in moderate condition. Fat ewes should be fed according to the next lower weight category and thin ewes at the next higher weight category. Once desired or moderate weight condition is attained, use that weight category through all production stages.

<sup>d</sup>Values in parentheses are for ewes suckling lambs the last 4–6 weeks of lactation.

<sup>e</sup>Lambs intended for breeding; thus, maximum weight gains and finish are of secondary importance.

<sup>f</sup>Maximum weight gains expected.

Source: Data from National Research Council, Nutrient Requirements of Sheep, 6th ed. (Washington, D.C.: National Academy of Sciences, 1985)

**Table 2** Macromineral Requirements of Sheep (Percentage of Total Diet Dry Matter)

Nutrient	Requirement
Sodium	0.09–0.18
Calcium	0.20–0.82
Phosphorus	0.16–0.38
Magnesium	0.12–0.18
Potassium	0.50–0.80
Sulfur	0.14–0.26

Source: Data from National Research Council, *Nutrient Requirements of Sheep*, 6th ed. (Washington, D.C.: National Academy of Sciences, 1985)

**Table 3** Micromineral Requirements of Sheep and Maximum Tolerable Levels (ppm, mg/kg of Total Diet Dry Matter)

Nutrient	Requirement	Maximum Tolerable Level
Iodine	0.10–0.80	50
Iron	30–50	500
Copper	7–11 <sup>a</sup>	25 <sup>b</sup>
Molybdenum	0.5	10 <sup>b</sup>
Cobalt	0.1–0.2	10
Manganese	20–40	1,000
Zinc	20–33	750
Selenium	0.1–0.2	2
Fluorine	—	60–150

<sup>a</sup>Requirement when dietary molybdenum is less than 1 mg/kg. For higher Molybdenum levels more may be required, but that is rare.

<sup>b</sup>Lower levels may be toxic under some circumstances. See source, pp. 16–18 for details.

Source: Data from National Research Council, *Nutrient Requirements of Sheep*, 6th ed. (Washington, D.C.: National Academy of Sciences, 1985)

**Table 4** Composition of Some Common Sheep Feeds

	Dry Matter (%)	DE Sheep (Mcal/kg)	ME Sheep (Mcal/kg)	TDN Sheep (%)	Protein (?)	Digest. Protein (%)	Calcium (%)	Phosphorous (?)
sc = sun cured								
Alfalfa hay, sc, late vegetative	90	2.29	1.88	52	17.9	14.3	1.38	0.26
Alfalfa hay, sc, early bloom	90	2.22	1.82	51	16.2	12.7	1.27	0.20
Alfalfa hay, sc, full bloom	90	2.10	1.72	47	13.5	9.4	1.13	0.20
Alfalfa hay, sc, mature	91	2.17	1.78	49	11.7	7.7	1.03	0.17
Barley, grain	88	3.35	2.74	76	11.9	9.8	0.04	0.34
Barley, straw	91	1.93	1.58	43	4.0	0.7	0.27	0.07
Beet, mangel, fresh root	11	0.39	0.32	9	1.3	0.9	0.02	0.02
Beet, sugar, dehydrated	91	2.96	2.43	67	8.8	4.5	0.63	0.09
Bluegrass hay, Poa compressa, sc	92	2.44	2.00	55	9.6	4.1	0.28	0.25
Bromegrass hay, sc	91	2.20	1.80	49	8.8	4.8	0.31	0.17
Calcium phosphate (dical)	97	-	-	-	-	-	21.3	18.7
Canarygrass, reed, hay	91	1.97	1.61	45	9.4	5.8	0.35	0.23
Clover, red, hay, sc, early bloom	86	2.44	2.00	55	16.0	11.4	1.24	0.30
Corn, grain (54 lb/bushel)	88	3.39	2.78	77	8.9	5.7	0.02	0.31
Corn, silage, with ears	33	1.03	0.85	23	2.7	1.2	0.08	0.07
Corn, stalks, no ears/husks, stover	85	2.21	1.82	50	5.6	2.5	0.49	0.08
Cottonseed meal, mech. extracted	93	2.58	2.12	59	37.9	27.3	0.20	0.90
Limestone, ground	98	-	-	-	-	-	33.32	0.02
Meadow plants, intermtn, hay, sc	95	2.43	1.99	55	8.3	5.0	0.58	0.17

**Table 4** Composition of Some Common Sheep Feeds (continued)

sc = sun cured	Dry		ME Sheep		TDN		Protein (?)	Digest. Protein (%)	Calcium (%)	Phosphorous (?)
	Matter (%)	DE Sheep (Mcal/kg)	ME Sheep (Mcal/kg)	Sheep (%)	Protein (?)	Phosphorous (?)				
Oats, hay, sc	91	2.13	1.75	49	8.5	5.2	0.22	0.20		
Oats, straw	92	1.91	1.57	44	4.1	0.3	0.22	0.06		
Orchardgrass hay, sc	91	2.33	1.91	53	10.2	6.5	0.35	0.32		
Prairie plants, midwest, hay	95	2.26	1.86	51	6.7	2.7	0.34	0.12		
Rapeseed meal, mech. extracted	92	3.04	2.49	69	35.6	30.1	0.66	1.04		
Rye, distillers grain, dried	92	2.59	2.13	59	21.6	12.9	0.05	0.48		
Sorghum, grain	90	3.48	2.85	79	11.1	8.2	0.03	0.29		
Sorghum, silage	30	0.74	0.61	17	2.2	0.6	0.10	0.06		
Soybean meal, mech. extracted	90	3.37	2.77	77	42.9	36.8	0.26	0.61		
Sunflower seed meal, solv. extr.	90	1.79	1.46	41	23.3	18.9	0.21	0.93		
Sweetclover hay, sc	87	2.04	1.67	46	13.7	10.0	1.11	0.22		
Timothy hay, midbloom	89	2.35	1.93	53	8.1	4.9	0.43	0.20		
Trefoil, birdsfoot, hay, sc	92	2.36	1.93	53	15.0	10.3	1.57	0.25		
Turnip, root, fresh	9	0.35	0.29	8	1.1	0.8	0.05	0.02		
Wheat, bran	89	2.78	2.28	63	15.2	11.8	0.11	1.22		
Wheat, grain	89	3.41	2.80	78	14.2	11.4	0.04	0.37		
Wheat, hay, sc	88	2.01	1.65	45	7.4	4.0	0.13	0.17		
Wheat, straw	89	1.60	1.32	36	3.2	-3.1	0.16	0.04		
Wheatgrass, crested, hay, sc	93	2.17	1.78	49	11.5	7.4	0.31	0.20		

Source: Data from National Research Council, Nutrient Requirements of Sheep, 6th ed. (Washington, D.C.: National Academy of Sciences, 1985)

## APPENDIX 6

### Sources

#### SHEEP INDUSTRY ORGANIZATIONS

American Sheep Industry Association (ASI)  
6911 S. Yosemite St.  
Englewood, CO 80112  
303-771-3500, fax 303-771-8200  
www.sheepusa.org

National Lamb Feeders Association  
(NLFA)  
1270 Chemeketa St. NE  
Salem, OR 97301

National Sheep Association  
950 S. Cherry St., Ste. 508

Denver, CO 80246  
303-758-3513, fax 303-758-0190  
www.nationalsheep.org  
celliot@agri-associations.org

OPP Concerned Sheep Breeders Society  
Holly Neaton, DVM, Secretary-  
Treasurer  
11549 Highway 25 SW  
Waterton, MN 55388  
952-955-2596  
hollyneat@juno.com  
www.interrain.com/opp

#### SHEEP BREED ASSOCIATIONS

*Barbados Blackbelly*  
Blackbelly Barbados Sheep Association  
International  
2050 Griffith Ave.  
Terrell, TX 75160  
972-551-7090  
info@blackbellysheep.org  
www.blackbellysheep.org

North American Barbados Blackbelly  
Sheep Registry  
P.O. Box 237  
McKean, PA 16426  
barbadoshp@aol.com  
members.aol.com/barbadoshp

*Black Sheep*  
American Black Sheep Registry  
Carol Bliss, Secretary  
4714 Glade Rd.  
Loveland, CO 80538  
970-667-0208  
bmerino@concentric.net  
www.concentric.net/~bmerino/  
absr.html

All colored sheep accepted.

*Black Welsh Mountain*  
American Black Welsh Mountain Sheep  
Association  
P.O. Box 534  
Paonia, CO 81428-0534

APPENDIX 6

oogiem@desertweyr.com  
www.blackwelsh.org— for general asso-  
ciation info  
www.blackwelsh.net— for info on the  
black welsh mail list

*Blueface Leicester*

Blueface Leicester Union of North  
America  
Kelly Ward, Secretary  
760 West V.W. Ave.  
Schoolcraft, MI 49087  
616-679-5497  
wardfarm@net-link.net  
www.bflsheep.com

Hexham-X Registry

for Bluefaced Leicester crosses  
P.O. Box 604  
Norco, CA 92860  
909-734-7307  
khornerstn@aol.com  
www.kpmcornerstone.com/hexhamx/  
index.htm

*Booroola Sheep*

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Janet McNally  
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RR 2 Box 63  
Hinckley, MN 55037  
320-384-7262  
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*Border Leicester*

American Border Leicester Association  
(since 1973)  
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Canby, OR 97013

503-266-7156  
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www.interrain.com/abla

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North American Border Leicester  
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Cuba, IL 61427-9625  
309-785-5058 (day), fax 309-785-5050

*California Red*

California Red Sheep Registry  
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1850 Reilly Rd.  
Merced, CA 95340  
209-725-0340  
highseas@cell2000.net  
www.cell2000.net/ca\_redsheep

*California Variegated Mutant*

see: American Romeldale/CVM  
Association under Romeldale

*Cheviot*

American Cheviot Sheep Society  
Ruth Anne Bowles, Secretary  
RR 1, Box 100  
Clarks Hill, IN 47930  
765-523-2767  
Mark Bernard mbernard@smig.net  
members.aol.com/culhamef/bcheviots/  
cheviot.htm

## SOURCES

### *Clun Forest*

North American Clun Forest  
Association

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21727 Randall Drive  
Houston, MN 55943-9748  
507-864-7585  
bramble@acegroup.cc  
www.clunforestsheep.org

### *Columbia*

Columbia Sheep Breeders Association  
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csbagerber@udata.com  
www.columbiasheep.org

### *Coopworth*

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Clay City, IL 62824-0391  
618-676-1046

### *Cotswold*

American Cotswold Record Association  
Vicki Rigel, Secretary  
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505-653-4084 or 505-622-0055  
Contact: Mary Skeen

### *Delaine-Merino*

American and Delaine Merino Record  
Association

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 Ashland, OH 44805  
 419-281-5786  
 info@admra.org  
 www.admra.org

Texas Delaine Association  
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 Rt 1, Box 26  
 Burnet, TX 78611  
 512-756-4257

Blacktop Delaine Merino Association  
 John Mater, President  
 10641 E. State Rd.  
 Nashville, MI 49073-0000  
 517-852-9247

Black-Top Delaine Merino Sheep  
 Breeders' Association  
 1775 Damman Rd.  
 Fowlerville, MI 48836  
 517-223-9728

Black Top and National Delaine  
 Merino Sheep Association  
 RD 4, Box 228-F  
 McDonald, PA 15057  
 412-745-1075

*Dorper*  
 American Dorper Sheep Breeders'  
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 Ronda Sparks, Registrar  
 1120 Wilkes Road  
 Columbia, MO 65201  
 573-442-4103, fax 573-874-8843  
 RondaS@sockets.net  
 www.dorperamerica.org

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www.countrylovin.com/ahsa/index.html

### *Icelandic*

Icelandic Sheep Breeders of North  
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### *Katahdin*

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APPENDIX 6

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Scottish Blackface Sheep Breeders  
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### *Shetland*

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 265 Truway Road  
 Luxemburg, WI 54217-9559  
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 www.shetland-sheep.org

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 HCR 13, Box 220

Fredonia, TX 76842  
 915-429-6226, fax 915-429-6225  
 southdown@ctesc.net

### *St. Croix*

St. Croix Hair Sheep Association  
 Jo Van Hoy, Secretary  
 Box 845  
 Rufus, OR 97050  
 509-773-5988 or 435-797-2181  
 backpackranch@pocketmail.com  
 Cole Evans, Pres.-Registrar  
 Utah State Univ., UMC 9400  
 Logan, UT 84322-4815  
 801-797-2181 (day)  
 cevans@mendel.usu.edu

### *Suffolk*

Ontario Suffolk Sire Reference  
 Association  
 Joe Stephenson, Secretary  
 8093 Fuller Rd.  
 Forest, ON  
 Canada N0M 2N0  
 519-243-1991  
 jrstephenson@odyssey.on.ca  
 ossra.tripod.com

United Suffolk Sheep Association  
 Missouri Office  
 Ronda Sparks, Office Manager  
 3316 Ponderosa St.  
 Columbia, MO 65201  
 314-442-4103, fax 314-443-3632  
 rondas@sockets.net  
 Utah Office  
 Annette Benson, Secretary  
 17 W. Main, P.O. Box 256  
 Newton, UT 84327-0256  
 435-563-6105, fax 435-563-9356

APPENDIX 6

suffolksheep@pcu.net  
www.u-s-s-a.org

*Targhee*

U.S. Targhee Sheep Association  
Christine Ashmead, Secretary  
P.O. Box 202  
Fernwood, ID 83830  
208-245-3869  
ashmead@smgazette.com  
www.ttc-cmc.net/~schuldt

*Teeswater*

American Teeswater Association  
Barbara Kloese, Registrar  
429 West U.S. 30  
Valparaiso, IN 46385  
219-759-9665 (voice & fax)  
kloese@gte.net  
Contacts: Barbara Burrows  
ewesincolor@wyoming.com  
www.angelfire.com/wy/teeswater  
Myrtle Dow  
myrtledow@aol.com

*Texel*

Texel Sheep Breeders Society  
Bonnie Davis, Secretary  
24001 N 1900 E Road  
Odell, IL 60460  
815-998-2359, fax 815-998-2113  
jbdavis@fcg.net

*Tunis*

National Tunis Sheep Registry  
Judy Harris, Registry Clerk  
819 Lyons St.  
Ludlow, MA 01056  
413-589-9653  
pbrashea@icx.net  
www.ezroane.com/ntsri/

*Wensleydale*

North American Wensleydale Sheep  
Association  
Sherry Carlson, Secretary  
4589 Fruitland Rd.  
Loma Rica, CA 95901  
530-743-5262  
info@wensleydalesheep.org  
www.wensleydalesheep.org

*Wiltshire Horn*

see: Am Livestock Breeds  
Conservancy  
P.O. Box 477  
Pittsboro, NC 27312  
919-542-5704 or 919-545-0022  
albc@albc-usa.org  
www.albc-usa.org  
contact: Pat Lenzo  
patlenzo@surfsouth.com  
www.psmag.com/HC/Wiltshires

You can check [www.rbparker.com/sheeporganizations.html](http://www.rbparker.com/sheeporganizations.html) for updates of the above list. Please also notify [ron@rbparker.com](mailto:ron@rbparker.com) of any changes.

Stockmaster (UK) [www.stockmaster.co.uk/site/welcome.asp](http://www.stockmaster.co.uk/site/welcome.asp) lists British breeds and how to contact breed societies. Also links to the Rare Breeds Survival Trust (RBST).

## BOOKS, VIDEO

*An Introduction to Keeping Sheep*, 2nd ed., 1996

Jane Upton and Dennis Soden.

Diamond Farm Book Pubns, ISBN 0-85236-332-X

*A Practical Guide to Sheep Disease Management*, 1985

Norman Gates

News-Review Publishing, Moscow, ID 52760-9999

ASIN 9-99960-022-0

*Beginning Shepherds Manual*, 1997

Barbara Smith

Iowa State University Press, ISBN 0-81382-799-X

*Lambing Time Management*

(set of three videotapes) by Don Baily, DVM and Woody Lane, PhD

Garden Valley Productions

240 Crystal Springs Lane

Roseburg, OR 97470

541-440-1926

wlane@rosenet.net

*Managing Your Ewe*, 1997

Laura Lawson

LDF Publications, ISBN 0-96339-231-X

Laura has two other books:

*Lamb Problems*, 1996, ISBN 0-96339-230-1

*Showing Sheep*, 1994, ISBN 0-96339-232-8

Order from Laura at 11114 Lawson Lane

Culpepper, VA 22701 ph. 703-825-0339

*Mountain Sheep: A Study in Behavior and Evolution*, 1971

Valerius Geist

Chicago University Press ISBN: 0-22628-572-3

*Nutrient Requirements of Sheep*, 6th ed, 1985

National Research Council

National Academy Press, ISBN 0-309-03596-1

read online free or buy at:  
[www.nap.edu/catalog/614.html](http://www.nap.edu/catalog/614.html)

*Practical Sheep Dairying: The Care and Milking of the Dairy Ewe*, 1982  
Olivia Mills  
Thorsons or HarperCollins (paper), ISBN 0-72250-731-3

*Sheep Housing and Equipment Handbook/MWPS-3*, 1994  
Harvey Himing, Tim Faller, Karl Hoppe  
Midwest Plan Service, ISBN 0-89373-090-4

*Sheep Raisers Manual*, 1984  
William K. Kruesi  
Williamson Publishing, ISBN 0-91358-910-1

*SID Sheep Production Handbook*  
American Sheep Industry Association  
6911 South Yosemite  
Englewood, CO 80112-1414  
303-771-3500  
View samples at:  
[www.sheepusa.org/resource/handbook/handbook.htm](http://www.sheepusa.org/resource/handbook/handbook.htm)

*Small-Scale Sheep Farming, 1997*  
Jeremy Hunt  
Faber and Faber, ISBN 0-57117-893-6  
UK oriented.

*Storey's Guide to Raising Sheep*, 2000  
Paula Simmons and Carol Ekarus  
Storey, ISBN 1-58017-262-8

*The Merck Veterinary Manual*, 8th ed, 1998  
Merck and Co., ISBN 0-91191-029-8

*The Veterinary Guide for Sheep Farmers*, 1990  
David C. Henderson  
Farming Press, ISBN 0-85236-189-0  
Outstanding book.

## SOURCES

### *Western Canadian Sheep Production Manual*

(which includes the Nutrition Guide for BC Sheep Producers by Dr. Steve Mason)

Available for about \$10 from Alberta Sheep and Wool Commission:  
[www.therockies.com/aswc](http://www.therockies.com/aswc)

If you have trouble locating books from the United Kingdom try:

Diamond Farm Book Publishers

P.O. Box 537, Alexandria Bay, New York 13607

USA

or

Diamond Farm Book Publishers

RR 3 Brighton, ON

Canada K0K 1H0

800-481-1353 (Mon.–Fri. 8–5 EST)

613-475-1771

[info@diamondfarm.com](mailto:info@diamondfarm.com)

[www.diamondfarm.com/genstore.htm](http://www.diamondfarm.com/genstore.htm)

Landsman's Bookshop, Ltd

Buckemhill, Bromeyard

Herefordshire HR7 4PH UK

01885-483429

sheep books at: [www.landsmans.co.uk/f-files/a26.htm](http://www.landsmans.co.uk/f-files/a26.htm)

## MAGAZINES

### *Sheep Canada*

Box 4, Site 8, RR#1

Olds, AB

Canada T4H 1P2

Cathy Gallivan, Ph.D.

403-224-3962, fax 403-224-3339

888-241-5124

[gallivan@sheepcanada.com](mailto:gallivan@sheepcanada.com)

[www.sheepcanada.com](http://www.sheepcanada.com)

### *The Black Sheep Newsletter*

25455 NW Dixie Mtn Rd

Scappoose, OR 97056  
Peggy Lundquist  
503-621-3063  
bsnewsltr@aol.com  
hometown.aol.com/jkbsnweb/

*The Shepherd Magazine*  
5696 Johnston Rd.  
New Washington, OH 44854-9736  
Guy and Pat Flora  
419-947-9289 or 419-492-2364  
fax 419-947-1302  
shepmag@bright.net

*sheep! Magazine*  
P.O. Box 10  
Lake Mills, WI 53551  
Dave and Doris Thompson  
920-648-8285, fax 920-648-3770  
www.sheepmagazine.com/

*The Shepherd's Journal*  
Box 99  
Mossleigh, AB  
Canada T0L 1P0  
403-534-2185, fax: 403-534-2144  
Garry & Doreen Schneider  
shepherd@telusplanet.net  
www.shepherdsjournal.com

*The Working Border Collie*  
14933 Kirkwood Road  
Sidney, OH 45365  
937-492-2215, fax 937-492-2211  
WBC@wesnet.com  
www.working-border-collie.com/

*Sheep Connection*  
2145 Megee Lane

## SOURCES

Nicholasville, KY 40356  
Dan and Susan Perkins  
859-858-4622  
suffolks@yahoo.com  
www.kyagr.com/sheepconnection.htm  
Somewhat regional (KY, TN, GA), but general information too.

*Sheep & Goat Research Journal*  
P.O. Box 51267  
Bowling Green, KY 42102-5567  
Glenn Slack  
phone/fax: 270-782-8370  
sheep2goat@aol.com  
Technical journal.

## SUPPLIES, EQUIPMENT

Canadian Co-Operative Wool Growers  
Box 130, 142 Franktown Road  
Carleton Place, ON  
Canada K7C 3P3  
613-257-2714, fax 613-257-8896  
ccwghq@wool.ca  
or  
918 1st Avenue South  
Lethbridge, AB  
Canada T1J 0A9  
800-567-3693, fax 403-380-6982  
ccwgab@telusplanet.net  
www.wool.ca/catalog.htm

Ash & Charlene Clements  
342 Frontier Road  
R D 6 Te Awamutu  
New Zealand  
Supplier of NZ eartags & NZ lamb teats  
clements@wave.co.nz  
www.clements.co.nz/

D-S Livestock Equipment  
18059 National Pike  
Frostburg, MD 21532  
800-949-9997, fax 301-689-9727

Horsepasture Mfg  
P.O. Box 25  
Spencer, VA 24165  
540-957-2558  
Homespun@kimbanet.com  
horsepasture.homestead.com  
Hay feeders to keep wool clean.

Jeffers  
P.O. Box 948  
West Plains, MO 65775  
800-JEFFERS

KV Vet  
P.O. Box 245  
3190 N. Road  
David City, NE 68632  
800-423-8211

Mid-States Livestock Supplies  
9449 Basil Western Road, NW  
Canal Winchester, OH 43110  
800-835-9665  
[www.midstateswoolgrowers.com/asp/supplies.asp](http://www.midstateswoolgrowers.com/asp/supplies.asp)  
or  
125 E. 10th Avenue  
South Hutchinson, KS 67505  
316-663-5147 or 800-835-9665

NASCO  
800-558-9596  
[www.nascofa.com/prod/Home](http://www.nascofa.com/prod/Home)  
[info@nasco.com](mailto:info@nasco.com)  
or

## SOURCES

NASCO farm supply—2 locations  
NASCO-Fort Atkinson-Eastern division  
901 Janesville Ave.  
Fort Atkinson, WI 53538-0901  
920-563-2446, fax 920-536-8296  
or  
NASCO Modesto-Western division  
4825 Stoddard Rd.  
Modesto, CA 95356-9318  
209-545-1600, fax 209-545-1669

Omaha Vaccine  
3030 L Street  
Omaha, NE  
800-367-4444, fax 800-242-9447  
catalog@omhavaccine.com  
www.omhavaccine.com/

PBS Livestock Health Supply  
P.O. Box 9101  
Canton, OH 44711-9101  
800-321-0235

Pipestone Vet Supply  
1300 So Hwy 75, P.O. Box 188  
Pipestone, MN 56164  
Order only: 800-658-2523  
(Catalog has helpful hints in it as well as a free phone-the-vet number on Fridays.)  
Phone the vet 507-825-5687 Fridays 1:00 P.M. to 4:00 P.M. CST.

Premier Sheep Supplies, Ltd.  
2031 300th St.  
Washington, IA 52353  
800-282-6631, fax 800-346-7992  
info@premier1supplies.com  
www.premier1supplies.com  
(Premier's fencing catalog is almost a textbook on building electric fences.)

Sydell, Inc.  
46935 SD Hwy 50

Burbank, SD 57010  
888-848-4177  
605-624-4538, fax 605-624-3233  
sydell@sydell.com  
www.sydell.com/

Townsend's Sales  
4141 South 25 West  
Trafalgar, IN 46181  
317-736-4047

Valley Vet Supply  
1118 Pony Express Hwy.  
Marysville, KS 66508  
Phone orders or questions: 800-360-4838  
fax orders: 800-446-5597  
service@Valleyvet.com  
www.valleyvet.com/

Wiggins & Associates Inc.  
1155 SW Towle Ave.  
Gresham, OR 97080-9626  
503-667-0716, fax 503-667-4701  
800-600-0716  
jpwiggins@att.net  
www.wigginsinc.com  
Has Meador's electric docker.

Wooltique  
P.O. Box 537, 1111 Elm Grove St.  
Elm Grove, WI 53122  
orders: 800-657-0746  
info: 414-784-3980

## ARTIFICIAL BREEDING

Dr. Martin Dally  
University of California, Davis  
Davis, CA 95616  
mrdally@ucdavis.edu

Elite Genetics  
605 Rossville Road  
Waukon, IA 52172  
319-568-4551, fax 319-568-6370  
lab 319-568-4847  
email: eltgenetic@aol.com  
www.elitegenetics.com

## TANNING PELTS

Bucks County Fur Products  
Box 204  
220 ½ N. Ambler Street  
Quakertown, PA 18951  
215-536-6614

Moosehead Tanners  
P.O. Box 1242  
Moosehead Industrial Park  
Greenville, ME 04441  
207-695-0272

New Method Fur Dressing  
131 Beacon St.  
South San Francisco, CA 94080  
Ph: 650-583-9881  
Ask for Sandra.

Stern Tanning  
P.O. Box 55, 334 Broadway  
Sheboygan Falls, WI 53085  
920-467-8615

## SHEEP MANAGEMENT COMPUTER SOFTWARE

Ewe Byte  
P.O. Box 375  
Fergus, ON  
Canada N1M 3E2  
519-787-0593, fax 519-787-2675  
ewebyte@entex.net  
[www.ovcnet.uoguelph.ca/associations/ewebyte/ewebyte.htm](http://www.ovcnet.uoguelph.ca/associations/ewebyte/ewebyte.htm)  
Considered the best by many users.

Farmstock  
Farmworks  
P.O. Box 250, 6795 S. State Road 1  
Hamilton, IN 46742-0250  
800-225-2848  
scott@farmworks.com  
Not sheep specific.

Flockmaster  
ABM  
417-862-3353  
Some negative comments.

Oviration  
Software for feedstuff calculation.  
[www.softagro.com/oviration.html](http://www.softagro.com/oviration.html)

Report Generation Services  
2237 Glenwood Rd.  
Vestal, NY 13850  
Phone 607-785-2322  
scubic@earthlink.net  
[home.earthlink.net/~scubic/](http://home.earthlink.net/~scubic/)  
Has a sheep module and medical module, very simple level according to the supplier.

Shepherd Software  
Mountain View Software  
RR 1, Box 9, Site 9  
Didsbury, AB

## SOURCES

Canada TOM OWO  
403-335-9477  
info@mountainviewsoftware.com  
www.mountainviewsoftware.com

For enrollment in a national program see also:  
National Sheep Improvement Program (NSIP)  
6911 South Yosemite Street, Suite 200  
Englewood, CO 80112-1414  
303-771-5717, fax 303-771-8200  
www.nsip.org  
info@nsip.org

## SOME USEFUL WEB SITES

Cornell University has [www.sheep.cornell.edu/sheep/index.html](http://www.sheep.cornell.edu/sheep/index.html) and [www.vet.cornell.edu/consultant/consult.asp](http://www.vet.cornell.edu/consultant/consult.asp) dealing with husbandry and veterinary care. They also have a poisonous plant site at [www.ansci.cornell.edu/plants](http://www.ansci.cornell.edu/plants)

Purdue University has [vet.purdue.edu/depts/addl/toxic/cover1.htm](http://vet.purdue.edu/depts/addl/toxic/cover1.htm) for more on poisonous plants.

The Maryland Small Ruminant Page, [www.sheepandgoat.com/](http://www.sheepandgoat.com/) has many useful links.

Check [www.adds.org](http://www.adds.org) or phone Mike Opperman at 608-848-0955 for information about the National Sheep Database CD. The search system is rather crude and slow, but there is lots of information, including the SID Handbook.

From Australia comes a very useful veterinary site:  
[www.sheepvet.com](http://www.sheepvet.com)

The USDA has the following sites about cost-sharing programs: [www.fsa.usda.gov/pas/](http://www.fsa.usda.gov/pas/) and [www.ams.usda.gov/lsg/](http://www.ams.usda.gov/lsg/)

For animal drug information from FDA: [informatics3.vetmed.vt.edu/](http://informatics3.vetmed.vt.edu/)

For FDA CVM:  
[www.fda.gov/cvm/](http://www.fda.gov/cvm/)

## APPENDIX 6

For having wool tested in a laboratory (Yocom-McColl Labs): [www.ymccoll.com/](http://www.ymccoll.com/)  
For a list of small-scale wool processors: [www.rbparker.com/Processors.html](http://www.rbparker.com/Processors.html)  
See also [www.rbparker.com/](http://www.rbparker.com/) for some other information of interest to sheep raisers.

Disclaimer: email addresses and Web URLs such as those listed in this appendix and elsewhere in *The Sheep Book* often change unpredictably. If one fails to work, try searching using a search engine such as [www.google.com](http://www.google.com).