

DAIRY SHEEP BASICS FOR BEGINNERS

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History

Sheep have been raised for their milk for thousands of years. Today the commercial dairy sheep industry is concentrated in the European and Mideastern countries on or near the Mediterranean Sea. France alone has almost one million ewes in dairy production. Most of the world's sheep milk is processed into cheese. Roquefort, the blue cheese of south central France, is one of the better known of the sheep milk cheeses. The U.S. annually imports more than 60 million pounds of cheese made from sheep milk.

It is estimated that approximately 100 farms in the U.S. are now milking ewes. Sheep dairy farms are spread throughout the country with the largest concentration located in northwestern Wisconsin. Some very large sheep dairy farms are located in New York and California. While the potential market for sheep milk and sheep milk products appears very promising, the present markets for sheep milk are few. Before venturing into a dairy sheep enterprise, be sure you have identified a stable market.

Characteristics of Dairy Sheep

Sheep that are commercially milked are of the same genus and species (*Ovis aries*) as sheep that are raised for meat and wool. However, a few specialized dairy breeds have been developed over time that are exceptional milk producers, e.g. East Friesian of Germany, Lacaune of France, Sarda of Italy, Chios of Greece, British Milksheep of the U.K., and Awassi and Assaf of Israel. These breeds will produce 400 to 1,100 pounds of milk per lactation. Due to very strict animal health regulations on the importation of live sheep, embryos and semen, these breeds are not readily available to U.S. producers. There are a few East Friesian sheep and their crosses available that were imported into Canada and then into the U.S. It is anticipated that there will be improved access to specialized foreign dairy sheep genetics in the future.

Domestic breeds which appear to be the best adapted to dairy production are the Dorset, Polypay and Rideau Arcott. Individual ewes of many other breeds also are good milk producers. However, the milk production of domestic ewes (100 to 200 pounds per lactation) is far below that of the specialized dairy breeds.

There are very large differences between breeds of sheep for all production characteristics so ewes that are milked can also be very variable depending upon the animals selected. Following are some realistic ranges for various characteristics and production traits:

Ewe Traits:

- Mature body weight (ewes) - 150 to 170 pounds
- Attainment of mature size - 2 to 3 years
- Productive life span - 6 to 8 years
- Wool production - 6 to 10 pounds per year

Reproduction:

Seasonal breeders - will mate from September through December
Length between estrous periods - 17 days
Gestation length - 147 days (~ 5 months)
Lambing months - February through May
Puberty - 7 to 10 months
First lambing - 1 or 2 years
Number of lambs per birth - 1 to 3

Lamb Growth:

Birth weight - 7 to 10 pounds
Survival of lambs to weaning - 85 to 95%
Weaning age - 30 days (30 to 60 days younger than for non-dairy flocks)
Weaning weight - 20 to 35 pounds
Daily gain (postweaning) - .6 to .9 pounds per day
Lamb market weight and age - 100 to 125 pounds at 5 to 8 months

Lactation Traits:

Lactation length - 90 to 150 days for domestic ewes, 120 to 240 days for specialized dairy breeds
Milk production per lactation (mature ewes) - 100 to 200 pounds for domestic ewes, 400 to 1,100 for specialized dairy breeds, 250 to 650 pounds for crosses between domestic and specialized dairy breeds
Fat content of milk - 6 to 8%
Protein content of milk - 5 to 7%

Sheep Housing

Most dairy sheep producers should have a barn or shed that can accommodate all their ewes. Fifteen to 20 sq. ft. of barn space per ewe is necessary to provide adequate space for ewes and lambs. The barn should have a porous floor (dirt, gravel, etc.) to allow moisture to move away from the sheep. The barn also should have good ventilation but be draft-free to prevent chilling of newborn lambs. Such a barn is a necessity for flocks which lamb in the winter.

Ewes and lambs can be maintained in barns and dirt lots year round and fed stored feeds, but use of pasture will decrease feed costs. One acre of improved and fertilized pasture should support at least 5 ewes for the grazing season. Pastures can be fenced with traditional woven wire or with 5 strands of high tensile electric fencing. Greater efficiency of pasture use will be achieved if large pastures are temporarily subdivided into smaller paddocks with portable electric fencing.

Sheep are often grazed with cattle, but ewes in lactation should be grazed separately so they do not have to compete with cattle for available forage. In areas where predatory animals are a concern, guard dogs, donkeys and llamas that have been bonded to sheep often are commingled with sheep as a deterrent to predators. Sheep should not be commingled with horses or pigs.

Feeding

Adequate amounts of clean water are essential for maximum production. Lactating ewes have the highest water requirement of any class of sheep at approximately 3 gallons per head per day.

Ewes can be feed a variety of feedstuffs. The most common feeds for sheep are pasture, hay (legume, grass or legume/grass mix), haylage, corn silage, grain (corn, oats or barley), soybean meal,

loose salt with trace minerals added, and loose mineral supplements. The ewe's requirements are the greatest during the last month of gestation and during lactation. Table 1 presents some sample rations for a ewe throughout the year.

Total feed requirements for a ewe for a year will be dependent upon her lactation length. A ewe milking for 180 days would require approximately 1600 pounds of alfalfa hay, 325 pounds of corn and 45 pounds of soybean meal per year if these were the selected feedstuffs.

Table 1. Alfalfa Hay and Corn Rations for 155 Pound Ewes

Stage of Production	Pounds of feed per ewe per day		
	Alfalfa hay	Corn	Soybean meal
Dry and non-pregnant	4.0		
Flushing (2 weeks before start of breeding season and continues for 4 weeks)	4.0	1.00	
Early pregnancy (first 4 months)	4.0		
Late pregnancy (last month)	4.0	1.00	
Early lactation (first 60 to 70 days)	5.0	1.75	.50
Mid lactation (~60 days)	5.0	1.50	.25
Late lactation	4.0	1.00	

A mineral mix prepared for sheep is offered free choice at all times.

The alfalfa hay can be eliminated for ewes on high quality pasture.

Some feeds can impart undesirable flavors to the milk (e.g. fish meal) and should not be fed in large quantities during lactation. Copper can be toxic to sheep. Only mineral supplements and prepared feeds that have been specially formulated for sheep should be fed, because many feeds for other livestock species contain added copper. Specially formulated mineral mixes for sheep also contain added selenium which is required by sheep but deficient in much of the Great Lakes' region.

Weaning age for lambs in non-dairy flocks is 60 to 90 days. However, in dairy flocks, lambs are weaned at approximately 30 days of age in order to put ewes into the milking parlor while they are still producing adequate amounts of milk. Nursing lambs must be offered at all times a high concentrate (75+% total digestible nutrients), high protein (16%) ration in an area where they can escape from their mothers. This extra feed will improve their weights at weaning and adapt them to solid feed. Once they are weaned, they should continue on this ration, with some alfalfa hay provided also, until reaching approximately 75 pounds. From 75 pounds to market weight, they can be fed a ration with a lower protein content (14%). Each lamb will require 350 to 400 pounds of feed from birth to market weight. Feed costs can be reduced if lambs are raised on pasture, but their daily gains generally will be less. Pasture raised lambs also are more susceptible to predators and to infestation with internal parasites.

Health Care and Sanitation

For the most part, health considerations for dairy sheep are the same as for sheep raised for meat and wool. Lambs should be vaccinated with a combination vaccine that gives protection against enterotoxemia and tetanus. Ewes should be given the same vaccine prior to lambing to provide

passive immunity to the newborn lambs to these two diseases. If abortion disease is common in your area, ewes should be vaccinated against *Campylobacter fetus* and *Chlamydia psittaci*. Lambs and ewes should be routinely treated for internal parasites, especially while on pasture.

Care must be taken to make sure that lactating ewes are not administered any drugs or compounds which may taint the milk. Lactating ewes should be monitored for mastitis and treated at the first signs of the disease. Routine use of the California Mastitis Test (CMT) will identify an incidence of subclinical mastitis for early treatment.

A complete flock health program should be developed in consultation with your local veterinarian.

A ewe and her lambs will produce about 7 pounds of manure per day. Combined with bedding material, this will result in production of 10 to 12 pounds of waste material per ewe per day while ewes are housed indoors. Provisions must be made for proper disposal of this material. Local and state regulations must be checked to determine the allowable amount of waste material that can be spread on your land.

A disposal method for carcasses of dead sheep also must be in place. This is an especially crucial problem because many rendering companies which collect dead stock at the farm will no longer pick-up sheep carcasses. Other disposal options to investigate include burying or land fills.

Milking Facilities and Equipment

Milking facilities and equipment will be one of the greatest expenditures of the dairy sheep operation. Before any facilities are built or equipment is purchased, visit as many dairy sheep farms as possible and visit with several dairy sheep equipment firms to determine what will work best on your farm. A milking parlor and milk room will be required. Producers should contact their State Department of Agriculture for regulations regarding requirements for such facilities.

Producers who will be milking less than 50 ewes should consider constructing a milking platform for the ewes to stand on while being milked. Most states will require the platform to be made of non-porous material, generally metal. The platform should be 32 to 36 inches off the floor with a ramp at either end for the ewes to enter and exit. One side of the platform will have a set of stanchions for securing the ewes and a manger for feeding grain. Adequate space must be available in front of the platform for a person to fill the manger with feed. The ewes are stanchioned side by side and milked from the rear. When stanchioned, the rear legs of the sheep should come within 3 to 5 inches of the edge of the platform. The width of the platform will depend upon the size of the ewes to be milked, but a width of 35 to 45 inches from the stanchion to the rear of the platform will accommodate most ewes. Commercially manufactured stanchions come in groups of 6, so one platform should be constructed to accommodate 6 or 12 ewes at one time. If desired, two platforms can be constructed and set parallel to each other, back to back, with 40 to 45 inches between platforms for the milker(s) and milking equipment. Two platforms allow ewes on one platform to be milked while ewes on the other platform are released and replaced, thus eliminating the need to stop milking to wait for ewes to enter the platform.

Producers with 100 or more ewes should consider constructing a "pit" parlor where the ewes enter at ground level and the milker stands in a pit. Sheep tend to move into the parlor faster in a pit system than in a platform system, and sheep are easier to train to the pit than the platform system. The pit and the area on which the sheep stand are constructed of concrete. The dimensions are the same for the pit and platform systems with one possible exception. With a pit system, there is a choice of two possible stanchion systems - the stationary stanchion used in the platform system or a

movable stanchion. Movable stanchions are mounted on wheels and moved forward to allow a greater area between the stanchion and the pit than is present on a platform. This greater area allows the ewes faster entrance to the stanchions. Once all ewes are stanchioned, the entire stanchion system is moved back until the ewes' rear legs are near the edge of the pit. This movable stanchion can accommodate ewes of different sizes. To install a movable stanchion, there must be at least 90 inches of area in front of the pit plus some additional area for feeding of the sheep.

Minimum milking equipment in the parlor will include a vacuum pump and line, one set of milking claws, and a milking bucket. Milking time is reduced with more milking claws and buckets. Use of buckets requires carrying of milk from the parlor to the milk room. Labor is reduced, but capital and maintenance costs increased, if a pipeline is installed which transports the milk from the sheep to the milk room. In the milk room, the milk is deposited into a bulk tank for cooling.

After the milk is cooled, it can be transported to the processing plant. However, more often than not, it is moved from the bulk tank to plastic buckets or other large containers and frozen. Therefore, adequate freezer space is necessary for the storage of several days of production. While fresh milk may result in a product of slightly higher quality, frozen milk has been shown to produce very acceptable products. The ability to freeze milk on the farm and deliver large quantities to a processing plant at infrequent intervals has allowed the establishment of dairy sheep farms great distances from the processing plant.

Economics

In a dairy sheep operation, milk is one of three major products - the other two being meat and wool. Lamb and wool will be a major source of income from a dairy sheep operation, and their production must receive adequate attention in order to maximize returns.

Milk can be sold to a processor for conversion to cheese (yogurt and ice cream also are made from sheep milk) or the milk can be processed by the producer and marketed as a value added product. Before venturing into the processing of sheep milk, producers must make sure they have the necessary processing and marketing skills and a ready market for the final product. It probably is a good idea to first concentrate on the production of milk from sheep for sale to a processor. Processing your own milk can be a future effort if it appears to be economically feasible.

Table 2 presents a sample dairy sheep budget.

Table 2. Sample Dairy Sheep Budget.

Assumptions:

100 ewes of domestic x dairy breed cross

1.7 lambs raised per ewe, 1.5 lambs marketed per ewe, .2 lambs per ewe retained for replacements

Ewes graze pastures for 5 months each year

Lambs do not go to pasture

Item	Total	Your estimate
Receipts:		
Milk - 250 lb. x 100 head x \$.55	\$13,750	
Lambs - 150 head x 115 lb. x \$.70	\$12,075	
Cull ewes and rams - 15 head x 150 lb. x \$.20	\$450	
Wool - (100 ewes x 8 lb. x \$.40) + (170 lambs x 3 lb. x \$.20)	\$422	
Total receipts	\$26,697	
Feed costs:		
Ewe feed - (90,000 lb. hay x \$.04) + (32,500 lb. corn x \$.06) + (4,500 lb. soybean meal x \$.12)	\$6,090	
Ewe pasture - 500 ewe months x \$1.50	\$750	
Lamb feed - 375 lb. x 170 head x \$.09	\$5,738	
Misc. feed (mineral, lamb milk replacer, etc.)	\$400	
Total feed costs	\$12,798	
Other variable costs:		
Health program	\$700	
Marketing	\$500	
Supplies	\$900	
Misc. variable costs (e.g. utilities, equipment maintenance)	\$900	
Total other variable costs	\$3,000	
Fixed costs:		
Buildings, remodeling, fencing - \$11,000/10 years	\$1,100	
Ewes - (100 head x \$125)/5 years	\$2,500	
Rams - (3 head x \$300)/2 years	\$450	
Milking equipment - \$8,000/7 years	\$1,143	
Total fixed costs	\$5,193	
Total costs	\$20,991	
Net returns to labor and management	\$5,706 or \$57.06 per ewe	

SOURCES OF ADDITIONAL INFORMATION

People and Associations:

North American Dairy Sheep Association
Route 3, Box 10
Hinckley, MN 55037
(612-384-6612)

American Sheep Industry Association
6911 South Yosemite Street
Englewood, CO 80112-1414
(303-771-3500) (FAX: 303-771-8200)

Dairy Sheep Producers
Throughout the U.S.

Sheep Extension Specialist
State Land Grant Universities

Publications - General Sheep Production:

Sheep Production Handbook. American Sheep Industry Association, 6911 S. Yosemite St., Englewood, CO 80112-1414

Ricketts, G.E., Scoggins, R.D., Thomas, D.L., Thompson, L.H. and Carr, T.R. 1993. Management guidelines for efficient sheep production. North Central Regional Extension Publication 240. Available from Cooperative Extension Service offices in Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, Nebraska, South Dakota, Minnesota and Wisconsin.

Sheep Housing and Equipment Handbook, MWPS-3, Fourth Edition, 1994. Midwest Plan Service, Agricultural and Biosystems Engineering Department, 122 Davidson Hall, Iowa State University, Ames, IA 50011-3080 or Extension Agricultural Engineer, your Land Grant University.

Publications - Dairy Sheep:

Mills, Olivia. 1989. Practical Sheep Dairying. Thorsons Publishers Limited, Wellingborough, Northamptonshire NN8 2RQ, England.

Alfa-Laval. 1981. Systems Solutions for Dairy Sheep. Alfa-Laval AB, Agri-Group, S-14700 Tumba, Sweden.

U.S. Feed Grains Council. Profitable Milk Production from Sheep. 1400 K Street N.W., Suite 1200, Washington D.C. 20005.

Jordan, R.M. and Boylan, W.J. 1988. The potential for a dairy sheep industry in the midwest. AG-FO-3430, Minnesota Extension Service, University of Minnesota.

Greaser, G.L., Ishler, V.A., Harper, J.K. and Engle, C.C. Milking Sheep Production. Agricultural Alternatives. Pennsylvania State University, College of Agricultural Sciences, Cooperative Extension.

Various Dairy Sheep Symposium Proceedings. North American Dairy Sheep Association, Route 3, Box 10, Hinckley, MN 55037 (612-384-6612).

Proceedings of the Annual Great Lakes Dairy Sheep Symposiums. Wisconsin Sheep Breeders Cooperative, Richard Roembke, Treasurer/Secretary, 3696 Country Aire Dr., Cedarburg, WI 53012-9206 (phone/FAX: 414-377-1491)

Dairy Equipment Manufactures/Sales Representatives:

Westfalia
Attn: Jim Parker
1862 Brummel Dr.
Elk Grove Village, IL 60007

J. R. Roberts, Export Representative
Fullwood and Bland, Ltd.
Ellesmere, Shropshire
United Kingdom SY12 9DF

Bob Borchert
Schlueter Co.
3075 Streb Way
Cottage Grove, WI 53527

Alfa-Laval, Inc.
Attn: Mr. Mark Hart
11100 N. Congress Ave.
Kansas City, MO 64153

Alfa-Laval Agri, Inc.
c/o Randy Rheingans, Area Representative
713 Woodhaven Ct., NE
Rochester, MN 55906

Alfa-Laval Agri International AB
Sheep Dairy Equipment Division
S-147 00 Tumba
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La Paysanne, Inc.
Roger Steinkamp,
Gascoigne Equipment Dealer
Route 3, Box 10
Hinckley, MN 55037

Gascoigne Milking Equipment Ltd.
Attn: Mr. L. J. Harland
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