

BREEDS OF SHEEP FOR COMMERCIAL MILK PRODUCTION

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Summary

Any producer contemplating the prospect of sheep dairying will face the problem of breeds: which breeds or what type of animals to purchase (or develop) in order to have the most economical commercial milk production? The problem is not an easy one to solve because there is not a single breed that combines all favorable traits. Some breeds are better than others in producing milk and others are better in milk components (fat, protein, solids). Some breeds are more efficient feed converters and others give their milk more easily. Some breeds are more sensitive to the environment and others are more resistant to diseases. "What is the best breed, though?" many insist on asking. There is no best breed; there is only a breed that fits best the personal preferences of the owner and a breed that will produce reasonably well with the resources of a particular environment.

Domestic Breeds

Beginning in 1984 several U.S. sheep breeds were evaluated at the University of Minnesota for milk production potential. Ewes were chosen from available breeds and machine milked twice a day following weaning of their lambs at 30 days of age. Ewes were subsequently milked for 120 days. The performance of these breeds over a two year period for milk production and milk composition is shown in table 1. With the exception of the Finn and Romanov breeds, all other domestic breeds studied seem to have a similar potential for commercial milk production. The average daily milk production of all ewes was .47 kg per day. With such a low production, one wonders if these breeds can be milked economically. An indication that they might not is that the early pioneers of sheep dairying in the U.S. were using popular breeds such as Polypay and Dorset in their first attempt at milking. They were soon looking for ways to rapidly improve their average production. It is not to say, however, that these breeds should be disregarded all together. They have certain advantages that the more dairy type breeds might not possess such as: good adaptation to a wide array of environments, good lamb and/or wool production, ability to breed out of season (Polypay, Dorset), known behavior, and widely available at a reasonable price. By careful selection, their overall production could increase dramatically. Jordan and Boylan (1988) suggested that by mass selection and screening of the best milking ewes, overall milk production could increase by 30 to 40% in just a few years.

A lower milk production could be quite acceptable in some segments of the industry. It is well known that there exists a strong negative correlation between the total amount of milk and the percentage of fat. Generally, the higher the production the less fat there is in the milk. In order to produce a very high quality sheep milk cheese, the milk needs

to be high in butterfat (6-8%). Domestic breeds producing a moderate amount of milk do have higher butterfat content. If the dollar value of the milk is clearly dependent on its quality (fat and protein, the sum of them being the total useful dry matter) the discrepancy in terms of milk yield between a pure dairy breed such as the East Friesian and a domestic breed is much reduced in terms of overall return per ewe.

Table 1. Least-squares means for several milk traits by breed (1989-1990). Milking period only.

Breed	Milk in liters (pounds)	Fat (%)	Protein (%)	Lactose (%)	Solids (%)
Overall mean	57 (130)	6.6	5.8	4.7	17.9
Suffolk	69 (157)	6.7	5.9	4.7	18.1
Finnsheep	44 (100)	6.1	5.5	4.5	16.7
Targhee	62 (141)	6.9	5.9	4.8	18.4
Dorset	61 (139)	6.3	5.7	4.5	17.2
Lincoln	53 (121)	6.8	5.8	4.7	18.0
Rambouillet	65 (148)	6.6	6.1	4.9	18.3
Romanov	44 (100)	7.1	5.9	4.8	18.6
Outaouais	54 (123)	7.3	6.1	4.6	18.7
Rideau	77 (176)	6.6	5.8	4.8	18.0

W.J. Boylan (1995).

The East Friesian (Ostfriesisches Milchschaaf)

This breed of sheep is now readily available in the United States. Many entrepreneurs in Canada or the US are selling live animals, embryos or semen of different origins mainly from England, Holland, and Sweden (through New Zealand).

The East Friesian is considered one of the best milking sheep in the world. Average production of 450-500 kg per lactation of 220-240 days and more have been recorded. It has, however, one of the lowest fat and protein contents (5.5-6.5% and 5% respectively), and the increase in fat content during the lactation is very small (1 to 2%). The lower fat and protein content is somewhat detrimental for the production of high quality sheep milk cheese entirely dependent on fat and protein for yield, flavor and texture. To the best of our knowledge, there is no selection program in place on the East Friesian in the countries of origin. The purchase of semen (or live animals) from Europe shows a certain degree of heterogeneity in the quality of the animals.

Prolificacy of 230% has been reported making this breed one of the most prolific breeds. At The Spooner Agricultural Research Station, University of Wisconsin-Madison, Berger (1998) reports prolificacy of 200% on 12 month old and 230% on adult crossbred ewes. With their high milk production and high prolificacy, the East Friesian breed is an efficient lamb producer. Although it has a rather poor carcass conformation,

lambs produced from crossbreeding with a terminal breed such as Suffolk, Hampshire or Texel have remarkable growth with desirable carcass traits.

The East Friesian has a rather short breeding season starting 12 to 18 weeks after the longest day of the year. The best breeding period would be between September and November. Ewe lambs are precocious enough to be bred successfully at 7 to 8 month of age.

There is no doubt that by using the East Friesian in a crossbreeding system, a spectacular improvement can be achieved very quickly. An average milk yield of 160-180 liters (350-400 pounds) per ewe can be obtained very quickly after starting with an original flock of Dorset type ewes as observed at the Spooner Agricultural Research Station.

Milk production of 1, 2, and 3 years old ewes is shown in Table 2. East Friesian cross ewes have a lactation length 30 to 40 days longer than Dorset type ewes and produced more than twice as much milk. Fat and protein percentage of milk from Dorset type ewes is approximately 0.5 percentage units higher compared to milk from EF-cross ewes. No difference can be found for milk production or fat and protein percentages between ewes of different EF percentage. 50% EF ewes did not produce more milk than 25% EF ewes.

In North America, the desired level of EF breeding in commercial dairy ewes; however, still needs to be determined. But it seems that a high level of EF is not necessary to achieve a high level of production. A high level of EF might result in lower productivity due to a lower degree of adaptability to a new environment and to a higher incidence of health problems if not managed to a high standard.

Table 2. Milk Production of Dorset-Cross and EF-Cross Ewes.

Breed	Age	Number of ewes	Milking period only (days)	Total milk (kg)	% Fat	% Protein
Dorset-cross	1	73	79 ± 5	62 ± 9	5.9 ± .6	5.3 ± .05
	2	43	94 ± 7	91 ± 12	5.5 ± .7	5.8 ± .10
¼ EF-cross	1	124	112 ± 4	139 ± 7	5.5 ± .4	5.1 ± .04
	2	92	152 ± 5	206 ± 8	5.1 ± .5	5.4 ± .04
	3	35	173 ± 7	246 ± 13	5.3 ± .7	5.1 ± .07
3/8 EF-cross	1	69	101 ± 5	122 ± 9	5.3 ± .5	5.1 ± .05
	2	40	146 ± 7	190 ± 11	5.0 ± .7	5.3 ± .07
	3	13	160 ± 12	250 ± 21	5.1 ± .5	5.2 ± .10
½ EF-cross	1	71	99 ± 5	128 ± 9	5.1 ± .5	4.9 ± .04

2	16	145 ± 11	187 ± 18	5.0 ± 1.1	5.4 ± .10
3	12	178 ± 12	250 ± 22	5.0 ± 1.3	5.1 ± .10

Berger, 1996, 1997, 1998

The Lacaune

The Lacaune was introduced in the United States in 1998 by the Spooner Agricultural Research Station, University of Wisconsin-Madison with the importation of two Lacaune rams from Canada and frozen semen from Great Britain.

The Lacaune is the most important sheep dairy breed in France with 800,000 ewes being milked mostly for the production of Roquefort cheese. It is important to note that before 1965, the Lacaune breed, although used traditionally as a milking animal, could not be considered as a “dairy” animal. With the advance of milking technique (milking machine) and its expansion in the 1960’s and the high demand for sheep milk products, an intense selection program was started. The milk production of the Lacaune breed increased from 80 liters to 270 liters in about 30 years. The milk production for the Lacaune breed in France **always** refers to a **milking period of only 165 days** excluding the suckling phase. In 1985, fat and protein content was added to the selection program to enhance the cheese making properties of the milk. In 2001, the selection scheme started to include the resistance to sub-clinical mastitis and udder morphology.

The adult Lacaune has an average prolificacy of 170 to 180% with a rather long breeding season starting early (June-July) making it an ideal breed for late fall or early winter lambing. Ewe lambs can be bred very successfully at the age of 7 to 8 months and have a prolificacy of 140%.

Studies at the Spooner Station show that the Lacaune is as good as the East Friesian to improve the milk production of other breeds when used in crossbreeding and that their milk has a higher butterfat content. The number of lambs born, however, is significantly lower.

At the time of the writing of this article (August 2004), the future of the importation of Lacaune semen in the United States is uncertain. Direct importation from France is not possible as long as USDA-APHIS does not revise the health requirements stated in the 1995 protocol of importation of ovine semen from France.

The Awassi

The Awassi can be considered a true dairy breed, but it is not available in North America. The Awassi is a common dairy breed in Turkey, Syria and Israel. The improved Awassi found in Israel is capable of production of 300 to 350 kg in 200 days with high butterfat content. The prolificacy is low (120-130%) and would significantly reduce the lamb production. Frozen semen of the improved Awassi is available from New Zealand and Australia.

This breed is very well acclimated to a hot and dry climate and could be very valuable in some areas of North America.

Other breeds

Some producers in North America are using other breeds such as the British Milksheep or the Icelandic. Very little comparative information is available on their ability as milk producers. Their importance for the dairy sheep industry cannot be assessed at the present time.



Lacaune x Dorset crossbred ewe lambs



East Friesian x Dorset crossbred ewe lambs

Conclusion

Domestic breeds generally do not produce enough milk when milked with a milking machine to be economically viable as dairy animals. However, because of large differences between individuals of the same breed it seems that the overall production could be fairly quickly improved with intense selection. The quickest way, however, to obtain an economical level of viable milk production is to cross any domestic breed with a breed such as the East Friesian or the Lacaune. Both breeds are specialized dairy breeds, and both are available in North America. The percentage of dairy breeding does not need to be large to have a significant increase in production. Crossbreeding with East Friesian increases the milk production, decreases the fat content of the milk and increases the lamb production. Crossbreeding with Lacaune results in a similar increase in milk production, increases the butterfat content and reduces the number of lambs born.

The use of either breed, East Friesian or Lacaune, as a purebred or in a crossbreeding system with any other breed, seems unavoidable for the production of a sufficient amount of milk in order to be profitable.

Reference

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