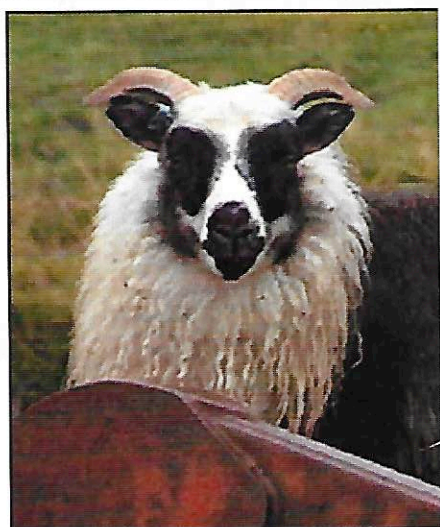




Icelandic Sheep Breeders of North America

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Icelandic Sheep Dairying

Laurie Ball-Gisch
ISBONA Newsletter Editor

This issue of the ISBONA Newsletter has a focus on the dairying of Icelandic sheep. Many of us were attracted to the Icelandic breed because the sheep were advertised to us as a "triple purpose breed" - meaning, sheep that yield meat, wool and milk as the fruit of the shepherd's labor.

Because Icelandic sheep are so beautiful, they appeal to a new "class" of shepherd: many people who have never kept livestock find themselves attracted to a romantic view of sheep-keeping inspired by the Icelandic sheep. The idea that these sheep have a triple purpose is very appealing, especially to these new "homesteaders."

What does it mean to say "Triple-Purpose Breed"?

Use #1 - Meat

Therefore, it can be said that a 'dairy ewe' is a sheep of any breed that has the capacity to give a sustained yield of milk over and above that required to rear her lambs.

Olivia Mills
Practical Sheep Dairying:
The Care and Milking of the Dairy Ewe

Without a doubt, many farms make a portion of their income from selling lamb for the freezer. The meat has a mild "gourmet" flavor and can turn somebody who says "I never eat lamb" into a steady customer. In fact, in our household, our children prefer a lamb stew over a beef stew and eagerly eat the lamb chops off the grill. In Iceland, the primary product of the breed is the meat, and much effort goes into producing stud sires that will produce highly marketable carcasses for the meat market. With the advent of semen importation into this country, the quality of the sheep produced has risen dramatically, with the primary emphasis on meat conformation. In Iceland 90% of the farmers' income is from sale of meat from their sheep.

Use #2 – Wool

Icelandic fleeces are beautiful on the animal, and a clean, healthy fleece is a joy to skirt and work with. The wool is dual coated, so the fleeces are very versatile. One can blend tog and thel together or separate the tog from the thel and use the two parts of the fleece separately for different purposes. In past issues of our ISBONA newsletter, our breeders have willingly and happily shared ways the wool can be harvested, used and marketed, sharing tips and techniques they have discovered for working with Icelandic wool in all of its versatility. One can go into past issues of the newsletter or even to the ISBONA website, and websites of fellow members to find out how to work with Icelandic wool. Beth Abbott wrote a book devoted to the Icelandic sheep and their wool titled "The Icelandic Fleece: A Fibre for All Reasons."

Use #3 – Milk

Over the course of the 20 years that Icelandic sheep have been in North America, little has been written about dairying of Icelandic sheep (in spite of the "triple purpose" claim). Yet one farm has been milking their sheep on a larger commercial basis now for several years; another farm makes artisan cheeses from their Icelandic sheep and several others offer Icelandic sheep milk soaps to their customers. We have had articles on how to make cheese, yet little is shared about our breeders' actual experiences in milking the Icelandic ewe. When people visit the ISBONA website and try to find out more about this third "purpose" they find it difficult to receive any information about milking Icelandic sheep.

Lately there have been some heated internet email-list discussions about whether or not the Icelandic sheep is a "dairy breed." The main debate seems to be whether they can be milked on a "commercial basis." Those who are milking the breed have not been providing data to either disclaim or support the breed as a milk breed and there seems to be great reluctance to share information about this aspect of the Icelandic sheep. For some reason there seems to be a lot of emotion involved in this issue and I have even been told that "unless somebody milks their own sheep, they have no business advertising the Icelandic as a triple-purpose breed."

I have met many Icelandic sheep owners who do not eat their own sheep, yet they sell stock to people who want to produce lambs for the freezer; I know many more shepherds who enjoy keeping Icelandic sheep, yet have no interest in ever using the wool - they do not spin, they do not knit or weave or felt. I have heard tell of a barn full of many years' accumulation of shorn, unused fleeces, just discarded in a heap. Yet these folks advertise their sheep as having "excellent fleeces" (how do they really know that?) Do you need to eat the meat or spin the wool in order to advertise the "meat" or "wool?" Must you MILK your sheep before you can tell potential new flock masters that this is a "triple-purpose breed" or that the Icelandic sheep has the potential to be milked?

In mulling over these contradictory and confusing statements and discussions, I decided it was time to devote some pages of our newsletter to dairying. I am grateful to the authors included in this issue for taking the time to share their knowledge, their experiences, and their thoughts about milking Icelandic sheep. I hope that you will appreciate their efforts here.

For those who are new to the idea of milking sheep in general, and Icelandic sheep in particular, I would like to preface the dairying section of this newsletter by including excerpts from a "must read" book for anybody who is contemplating milking their sheep. Olivia Mills is considered the expert in sheep milk dairying. Unfortunately her book "Practical Sheep Dairying" has been out of print for some time. I was finally able to locate a copy of her rare book and when I got my copy in hand, I found her wisdom inspiring and calming in light of the recent controversy over Icelandic sheep and dairying. Because the book is so hard to find, I am highlighting some points from the book as an introduction to the dairying articles to follow.

What is a Dairy Sheep?

In her book, Olivia Mills states that "All ewes that have lambed should give milk, but some breeds give more than others. Almost all ewes that have successfully reared twins or triplets in the past should have enough milk to warrant becoming dairy animals.... The dairy ewe, like the dairy cow, must be able to milk rather than put on fat. The difference between meat and dairy sheep is identical to that between beef and dairy cows." (page 21) "Basically, a dairy ewe must be able to convert food into milk rather than meat. As with cows, there are within sheep breeds various genetic lines that can utilize food intake one way or another. It goes without saying that it is the ones that manufacture milk that are most likely to end up in the dairy." (page 26).

This is an important point for shepherds to keep in mind as they develop their flocks. Those who are choosing AI genetics must remember that the emphasis and focus in Iceland is on meat conformation. Our breeders should keep in mind that there is within the Icelandic breed, a traditional "dairy conformation" (the taller, leaner ewe) and I hope that we do not lose that milky, dairy conformation in favor of the meat conformation. That is not to say that the AI genetics will not produce milky ewes; for in Iceland the farmers want milky ewes so that their lambs grow nice and fat. But there will only be a percentage of ewes that are most suitable to the dairy parlor and it is my hope that there will always be breeders out there preserving this trait within our breed.

"Prolific ewes seem to have the capacity to increase their milk yield to accommodate the extra demand, so that in theory, any prolific ewe, milked twice a day by hand or machine, should give more milk than ewes who traditionally only have single lambs. This does not always happen in practice. A lamb will suckle up to forty times a day in early life at a rate of 175-180 sucks per minute. This is a tremendous stimulus to the ewe and cannot be easily imitated by man." (p. 22)

'I reckon there is as much difference within the breeds as there is between them.' ... for your farm, individual sheep from any breed or cross that adapted well to your environment, could be as good of milkers as from a special dairy breed who maybe didn't adapt as well. The only way you will know is by testing individual sheep. The more you test, the more you will find what you want. The man I consider one of the best sheep dairymen I ever heard of would buy flocks of sheep, milk them, pull out the best milkers and sell the rest. That is what I call strength in numbers.

Don Lecheler, dairysheep.yahoogroups.com, September 29, 2004

Iceland reports on milkiness of ewes by recording growth rates of lambs. This is not a new idea by any means. In fact, Alan Fraser, in his book "Sheep Farming", first published in 1937 states that "Milkiness is a quality that records itself in the growth and quality of lambs during their first month of life." For some breeders the only way to measure ewe "milkiness" is through the growth rate and size of the lambs she produces. Yet those who are milking the sheep claim that there is more to this simplified equation. Fast growth rate does not always equate "milkiness." However, an observant shepherd knows his ewes who produce ample milk by their consistently big and healthy lambs. One would not want to choose a ewe lamb to milk, as younger ewes do not produce as much milk as older ewes. The Icelandic sheep continue to grow and mature into their 3rd and 4th years and will not hit peak milk production until they reach maturity. But a ewe who is 5 years old and whose twins are half the size of the other twins in the flock, is probably not producing enough milk and would not be a good dairy candidate.

Above and beyond looking at the actual milk yield, Olivia Mills makes this point early on in her book: "Handleability is the first and foremost trait to look for in dairy ewes. Breeds that are either less nervous by nature or have always had a greater degree of connection with man or have been kept in smaller numbers, or that have been hand-reared, are likely candidates." (p. 22)

Placid temperaments and "greedy ewes" are said to be the best choices for milking. "Fear is the greatest inhibitor of milk let-down. A nervous ewe will not let down her milk satisfactorily, will upset the others and cause a lot of frayed tempers. Ewes learn a routine very quickly and provided that have had no bad experiences, soon settle down to regular feeding, milking and handling." (p. 24). Mills says that food is the key factor to getting your dairy ewes to trust you. The ewes must always associate you with food and follow a bucket, but be sure to never let them find the bucket empty or they will mistrust you. "Quiet persuasion, bribery with lots of their favorite food and firmness are the best methods." (p. 160). Another point Mills makes is that a "really tame ewe that can be always persuaded to lead the flock is most useful." (p. 161)

In considering udder size and shape, Mills suggests "The highest yielding ewes often develop pendulous udders by the 3rd or 4th lactation and become difficult to milk by hand or machine. They are frequently impossible to suckle as well, so that they have to be culled." (p. 24). "Good teat

placement is essential. Most people imagine that a ewe has an udder like a goat, with teats seemingly attached as an integral part of the base. This is not the case with most breeds of sheep...Unless the teats are of good size, conical rather than cylindrical for preference, and well placed down the udder, they can be difficult to milk either by hand or machine." (p. 25)

Olivia Mills outlines the following suggestions in choosing ewes for potential milking (page 25). She says DO

- Choose calm, well-mannered ewes
- Choose greedy ewes, they are much easier to manage
- Choose ewes with well set udders with a well defined mammary gland, squarish rather than narrow, with the halves as even as possible
- Look for ewes with nice conical teats, as near the base of the bag as possible
- Look for ewes with a good, well defined cleft between the halves
- Try to check what the dam was like. A small udder does not necessarily denote a poor milker
- Try to choose ewes from a flock noted for prolificacy and good lamb weaning weights
- Choose ewes from flocks that are troublesome to dry off. This will indicate that they are persistent milkers.

On the DON'T side, Mills insists:

- Do not choose ewes that are exceptionally 'nervy'
- Do not choose ewes that tend to freeze or lie down when handled
- Do not try to milk ewes that are ticklish and continually kick when their bags are handled
- Do not try to milk ewes that have their teats half way up the udder without using a special 'hook'
- Do not choose ewes for milking with very small cylindrical teats (these are often the best teats for lambs to most easily nurse, however, Ed.)
- Do not choose ewes with exceptionally pendulous udders
- Do not choose overfat ewes; they will not milk as well as leaner ewes although it does depend a bit on when you are looking at them
- Do not buy a ewe that has had mastitis, even if it has completely cleared up. (p. 26)

It is my hope that the following articles by ISBONA breeders who have been milking their sheep will prove to be hopeful and inspiring to our readers. I would also like to invite future articles, including the pros and cons, so please, as you develop your flocks, consider documenting and sharing your experiences with your future and fellow breeders. ■

Wisconsin to host Great Lakes Dairy Sheep Symposium

Any doubts about the viability of the sheep-milk industry should have been wiped away in 2004, when a 100 percent Sheep-milk cheese, Gran Canaria, produced by Wisconsin master cheese maker, Sid Cook of LaValle, topped 725 other cow, goat and sheep-milk entries in the annual specialty-cheese competition conducted by the American Cheese Society.

The dairy-sheep industry continues to grow in numbers and stature in North America, and the annual Great Lakes Dairy Sheep Symposium has become a "must attend" event for those in or interested in the industry.

According to Dave Thomas, University of Wisconsin - Madison Extension sheep specialist, the Symposium is an important venue for potential producers and processors to gain a better understanding of the industry and for present producers and processors to obtain new ideas to improve their operations.

The tenth Symposium returns home to Wisconsin after very successful events in Ithaca, New York in 2002 and Quebec City, Quebec in 2003.

The Great Lakes Dairy Sheep Symposium will be held November 4 through 6 at the Hudson House Inn, Hudson, Wisconsin. It will include practical instruction on operating a sheep-dairy farm, lectures by scientists and progressive producers and sheep-milk processors, and tours of operating sheep-dairy farms and a farm-stead sheep-milk processing plant.

International speakers will include Pierre Billon a sheep milking systems scientist with the National Agricultural Research Institute of France, and Maristela Rovai, a lactational physiologist at the University of Munich,

Germany. Billon will discuss practical milking systems for small and medium sized sheep dairies, and Rovai will discuss the desired udder shape for optimum milk yield and milking time.

Additional topics to be discussed are milk testing, calculation of lactation yields, business management, a comparison of the East Friesian and Lacaune dairy-sheep breeds, the effects of feedstuffs on milk flavor, prevention of residues in milk, relationship between milk composition and cheese yield, cultures for specialty cheeses, and marketing of milk and sheep-milk cheeses.

On Sunday, November 7, following the Symposium, open houses will be hosted by Dave and Mary Falk, Love Tree Farm, Grantsburg, and the Spooner Agricultural Research Station, Spooner. Mary Falk produces some of the finest sheep-milk cheeses in North America, and her cheeses have won many awards. The Spooner Station, operated by the University of Wisconsin-Madison, has the only dairy-sheep research program in North America.

The 10th Annual Great Lakes Dairy Sheep Symposium is sponsored by the Dairy Sheep Association of North America and organized by the Wisconsin Sheep Dairy Cooperative and UW-Madison with major financial support from UW-Madison's Babcock Institute of International Dairy Research and Development.

A Symposium brochure, sponsor information and on-line registration can be found at www.cals.wisc.edu/cos/Current%20Programs.html or information can be obtained from Yves Berger, Symposium chair, at 715/635-3735 or yberger@facstaff.wisc.edu. The early-registration deadline is October 15. ■

Dairy Sheep Facts

- The U.S. imports over 70 million pounds of sheep milk cheese annually, over half of the world trade in sheep milk cheese.
- Familiar foreign sheep milk cheeses are Roquefort (France), Pecorino (Italy), Manchego (Spain), and Feta (Greece).
- There are about 150 dairy sheep producers in North America, and their numbers are growing.
- Old Chatham Shepherding Co. of New York is the largest dairy sheep producer in North America, milking 800 to 1000 ewes.
- Sheep milk markets by the Wisconsin Sheep Dairy Cooperative have increased tenfold in seven years, from 45,000 pounds in 1996 to 450,000 pounds in 2003.
- Producers receive between \$55 and \$70 per 100 pounds of sheep milk.
- In recent years, domestic sheep milk cheeses have won several national and international championships in competition with cow, goat, and other sheep milk cheeses.
- The dairy sheep industry is a positive contributor to the economic viability of family farms, agriculture industries and rural communities.

Our Farmstead Dairy Experiences at Skylonda

Jim Bailey

The goal at Skylonda Ranch is to raise animals in a sustainable manner. We are interested in animals that obtain most of their nutrition from pasture grazing instead of requiring a high level of supplements. In addition, we are not seeking the maximal production numbers that a commercial factory farm operation requires. We instead seek an integrated solution that provides added value for added effort.

Icelandic sheep are the primary animals at Skylonda, because of their versatility and ability to fit into a grass based operation. They provide two types of fiber, in a wide variety of colors. The meat is gourmet quality and can be raised on well-managed good pastures without requiring large inputs of grain for finishing. The possibility of grassed based milk production is an added bonus. We did not originally plan on milking, but thought it was a good future option

During the spring of 2003, we tried milking a few ewes by hand, just to see how it went. Our approach was to separate the ewes from the lambs in the evening, milk the next morning, and put them back together for the day. We did not milk every day and only continued this for a period of several weeks. Our experience was that we were getting between 0.5 and 1.2 liters of milk from each ewe at each milking. We used the milk around the house for cooking and drinking.

Our milking setup was an old wooden goat-fitting stand with two boards in the shape of a "V" that latch to hold the ewe. The sheep quickly learned that going into the stall away from their lambs meant treats and they were very easy to work with. Since we had not milked by hand before, it took 5 to 10 minutes per sheep, but it was restful enjoyable time spent talking to them and enjoying their company. We had one ewe that did not like to be milked. She would step around and tip over the bucket if she could. We chose to not milk her more than a few times and focused our effort on the ewes with better dispositions.

Based on this experience, we decided to repeat in the spring of 2004 with more ewes and a milking machine. The milking machine we chose is a surge bucket system attached to a vacuum pump and set-up for one ewe at a time. The bucket holds about 2.5 gallons of milk, so it is light and easy to work with.

We continued with the old wooden fitting stand and milking one sheep at a time. With this configuration, we spent more time handling each ewe than in milking her. The ewes waited in a pen off the milking room and quickly learned to enter the room and get on the stand for a treat. It often took more effort to move them out of the milking room than to get them in and on the milking stand.

This process was still quicker than milking by hand, especially when we got up to 24 to 28 ewes per day

Our original plan was to milk all of the ewes in the flock, starting once-a-day milking when their lambs were two weeks old, weaning the lambs at 6 weeks and then continuing until the ewes dried up. We were going to use the milk around the house, make some cheeses with it, and feed the remainder to the hogs. As with all plans, things did not go as expected, but we still learned a lot.

The idea of milking once per day and allowing the lambs to nurse the rest of the time, seems to be a good plan for a homestead dairy. During the first four to six weeks of lactation, the ewe is producing milk at her highest rate and we found twin lambs were able to continue growing well, even with us taking some of the milk. We did not do regular weighing of the lambs, nor did we have a control group not being milked, so we don't have formal results. Our informal experience is that earlier lambs did better than later ones and that the ewes that produced the most milk for us also had the lambs that were doing the best.

One problem was that with off-farm demands on our time, we did not milk every day. But, again this matches casual farmstead milking instead of commercial production. We did not see significant changes in milk production numbers from days when we milked 3-4 days in a row compared to milking every other day or even 1 out of three days. The changes we saw in production levels could all be traced back to things like pasture quality and amounts of fresh water available to the ewes. For example, one night the water trough had a leak and went dry and we had reduced production the next morning.

Our spring flush of pasture growth starts in late February or early March and begins tapering off with the dryness and heat of June. During our milking time, we supplemented the ewes with free choice alfalfa hay during the night, when they were not free out on pasture. We used a small amount of pea pellets, about 1/2 pound per day, as a treat to bring them in and to eat while being milked.

Initially there were 35 ewes that lambed. We eliminated two with triplets, two yearlings, and two with udder problems. This resulted in a total of 29 ewes that were milked at least once during the trial period. We started with 7 ewes and increased to a daily maximum of 26. During this time we rejected three ewes for temperament, one would lie down on the milking machine and the other two were hard to catch and would not get onto the milking stand on their own. We did not originally select for the milkiest ewes, but we did drop a couple that only gave us .2 pounds of milk per day. (Their numbers are still in the overall averages, but only for four or five milkings.)

We started milking on April 22nd and continued for 7 weeks, averaging three times a week. After a two-week lapse, we milked again four times in the final week. Although this is not an ideal milking schedule and our numbers do not reflect the total production that would be possible, we do have some numbers showing how milk production varied over early lactation and how it varied with the age of the ewe. Our ewes ranged in age from 2 to 6 years old. One was 6 years old, six were 4 years old, and 5 were 3. We have been told that milk production increases with age until 3 or 4, and then levels off, so most of our ewes are not to their peak production ages.

The best ewe produced an average of 1.2 pounds of milk over the first 7 weeks. The flock average was 0.8 pounds of milk with the top 12 ewes producing more than this average. We had four ewes that averaged over 1.0 pounds per day, with their best days being 1.4 to 1.6 pounds per milking. The worst ewe was a two year old who only produced 0.2 pounds of milk or about 1/2 cup of milk. All the other ewes produced at least 0.5 pounds or 1 cup of milk per milking. Of the poorer producing ewes, all but two were two years old and these two were sisters. Based on this experience, we believe that with selecting for milk production and several generations of experience we would be able to increase the average significantly.

During this seven-week period, the milk production per ewe stayed fairly constant. We started milking when the first ewes had two-week-old lambs and quit when they were 10 weeks old. Not milking for a week, during a time when the lambs were on pasture and starting to self-wean, significantly impacted milk production. The average production for the last week of this test was 0.6 pounds per ewe, or about 3/4 of what it had been earlier. Although some of the ewes did maintained their production levels during this time, most ewes declined. The ones that did maintain their levels were the better milkers overall.

Our pastures were starting to dry up at this time, so we weaned the lambs two weeks later and put them on the best pastures. The ewes were on poorer pastures, but all

started to recover condition as soon as they were not being milked or nursed. The worst ewe had dropped down in condition to a low 2 during this time. Most of the rest were between 2.0 and 2.5, with a very few above 2.5.

Although we did not milk daily and did not milk over the entire season, some extrapolations are not unreasonable. From our experience I would say that for our flock, being primarily on grass, and being milked once per day, that we can expect to get 1.0 pound of milk per ewe per day, if we eliminate the bottom 20% of the ewes. If we milked from two weeks of age and quit when pastures were bad, we could expect about 70 pounds of milk per ewe with once-a-day milking.

We did not milk the ewes out; their lambs were nursing as soon as the ewes left the milking area. If we were to milk twice a day, then production for this 10-week period of time would be more like 140 to 150 pounds of milk per ewe. If you are making farmstead cheese, then you could look to make about 1 pound of cheese for every 5 or 6 pounds of ewe's milk or about 25 pounds of cheese from each ewe if the lambs got nothing or 12 pounds of cheese if you shared with the lambs.

Since we did not milk more than 12 weeks, we don't have projections on how long the ewes would stay in production. Talking to other Icelandic breeders, we have been told that if they are milked continuously, they should stay in production for 4 to 5 months, which is similar to other breeds of sheep that are milked. Production does decline with the length of lactation, so a simple calculation of total milk possible production is not realistic.

From what we have been told, these numbers are about 1/2 of what you would get with East Friesians under typical conditions - thus, if you are going for maximal milk production then Icelandic sheep are probably not your best bet. If you are going for sheep that are easy to work with, provide great fleece and meat, and can produce reasonable quantities of milk on a pasture situation, then Icelandic sheep are a good option for the farmstead. ■

Guard Dogs and the Right to Farm

This is the substance of a decision by the Oregon Court of Appeals, on a case brought by Fran and Joe Mazzara of Hood River, Oregon, whose neighbors complained about excessive barking by their guard dogs, two Kuvasz who were livestock protection dogs.

The "Right to Farm" laws forbid any jurisdiction from establishing or citing any local "nuisance" laws that interfere with a legitimate farm's acceptable farming practice. The court decided that the use of livestock protection dogs and working dogs are legitimate farming practices and immune from any actions by any jurisdiction other than state laws.

This case established a precedent that may be cited in future cases across the United States. Fran Mazzara gave permission (nay, encouraged me) to spread the word about this case - she said it cost them a bundle and they want other dogs/farms to benefit from it. For further information, Fran can be reached at FMAZZARA@gorge.net

Micheal Desplaines

Ramblings on Milking Sheep

Karol Rich

Let me start by telling you a little about our place, Old Farm Icelandics. My husband and I, and 3 preteen daughters live on 20 acres in the beautiful Pacific Northwest. We have multiple farm animals along with the 30 to 40 breeding ewes we keep. We sell sheep milk soap that we make from start to finish here on the farm, as well as lamb and wool.

We usually milk 12 to 16 ewes, rotating among them depending on body condition, and how many new milkers that need to be trained and evaluated. Milking is at 9:00 am and 9:00 pm, because this works with our schedule, usually continuing for about 2 months. Then I have enough milk stored and the farm work really picks up, so it's a good time to quit for us.

The sheep here are fed grass pasture, blackberries and local grass hay if needed. We give grain treats to get them in the milkstand, and a bigger "treat" if a ewe's body condition is especially low during milking. I believe in the tough, thrifty nature of the Icelandic breed and select for these traits in my breeding stock. They must do well on local, low protein grass or have a good excuse why!

When I select breeding stock, these are some of things I look for. The ewe needs to have good shoulders and straight legs, no pinched elbows at the front. They need to have about 60% of their body length behind the last rib, good wide hips, and a U shaped crotch area. There needs to be enough room between the hind legs to accommodate a huge udder. When shopping for a ram I look for the same type of body and inspect the scrotal area carefully. The higher and wider the attachment, the more likely he will pass on good udders to his daughters. I look at the dam and granddams, if possible, to see what kind of udder genetics the animal might inherit.

If I am considering lambs, I also want to inspect the dam, and if possible, the granddams' udders as well as the lambs conformation. I look for an udder that has a good high and wide attachment at the rear, no shelf at the front and teats that point straight down. My ewes with the nicest and longest lasting udders look like they have a basketball cut in half and inserted between the rear legs, wider at the top than bottom, with nice well placed teats. These udders are not changing shape (breaking down) over the years of lambs and milking, and stay sound. Teats pointing forward are slightly better than those pointing outward to the inner thigh, though neither is desirable.

In my own flock, one of my breeding goals is for a ewe that lets down easily and has a large orifice, along with the nice udder and large quantity of milk. Milking the ewes with very small teats and a great letdown with a large orifice is MUCH than the ewes with large "handles" and lots of milk that you have to really work to get! Some of this is temperament, some genetics. I have found that you can milk even the wild ones fine, if you keep it calm and have a routine. I always get less milk if setting them up degenerates into a wrestling match and the ewe is upset

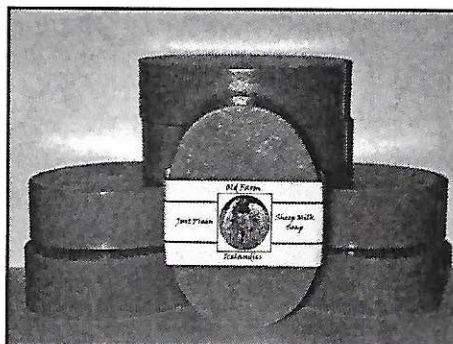
When we milk, sanitation is very carefully implemented. To get a quality product, be it soap or food, you must start with quality milk. We strain and chill as quickly as possible. All ewes are milked into separate containers so we can check for any discolored milk before it's poured into the bulk containers. Any milk that is slightly off is discarded, usually to the dogs or chickens.

We keep a clipboard out with us to chart how much each ewe gives at each milking. We graph this during the milking season and use it to help select better milking ewes and to tell if maybe there is something off about a particular ewe.

Often we can tell those that need more pasture time, or are getting mastitis by changes in the milk volume. Healthy ewes milk much better. This graph is a great tool for breeding decisions, too.

The twenty two ewes that I have graphed have shown me that in regards to milk volume, I have one outstanding ewe, 3 really good ewes and for various reasons the rest are okay. There is only one that isn't worth milking and that one gives me a fairly large amount of milk, but won't let down. I have to WORK to get it and it's not worth the time and effort. The best ewe gives 4# or so, the three good ones about 3# to 3 1/2# and the rest between 1 1/2# to 3#. The best one lets down easily, but has a small orifice, so it takes hand strength the milk her. She also kicks like a mule if you tickle her! The next best lot are nice to handle and milk pretty easily, just keep a treat in front of them please. The rest are rated lower on the scale for volume and ease of milking. Some of these are young animals that haven't come into their full abilities yet, some give less but are just SO easy to milk that it takes no time at all. Some stay in our breeding program because they give the same amount no matter what happens during their day. I'm looking for the consistency as well.

In closing let me say that we are still experimenting and learning. We're trying to improve the dairy quality of our flock each year, and there are so few statistics out there that it is a real trial and error process. But it is fun! As we grow our soap business and move towards milking more ewes and mechanizing, I realize how much more there is out there to learn! ■



Milking my Icelandic Sheep

Mike Kelley

Early on a beautiful summer morning, I walk out the lane to the field where my girls are. The mist is just rising from the Catskill Mountains that are so much a part of my life now. They are part of the same mountain chain that I grew up loving in Virginia. They are old, worn, timeless comfortable and familiar.

I come to the field and call to the sheep. They all look up and many baa in return. They usually come without much prodding and today they pass me by as they take off to the barn. The sound of the sheep bells tinkling and the sight of their tails wagging as they trot down the lane on this beautiful morning is enough to make me cry or laugh with joy.

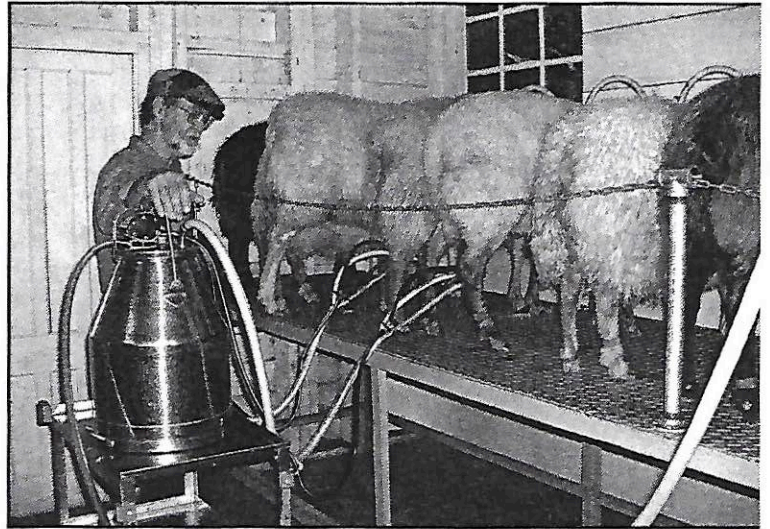
They crowd around the ramp up to the milking platform, many of them so anxious to get into the parlor to get their treat, a half cup of grain each, to make the milking parlor more attractive to them. I go into the parlor and pull the rope to open the door and the first dozen (always the same sheep in the first group, the greediest or pushiest of the bunch) come across the platform, their hooves clicking on the metal surface.

They put their heads into the headgates one by one. It's a cascade yoking system that only allows the ewes to put their heads into them in the proper order. It makes milking a larger group much easier. Even my horned ewes can get their heads in easily.

As I prepare to milk, I clean each udder and check the ewe over to make sure she is in good condition. I milk them two at a time into a portable bucket-type machine. Some are very polite in the parlor, taking a stance that makes teat-cup attachment easy. Others may be less enthusiastic and dance a little as I put the teat-cups on, especially ewes that are being trained to the parlor. I have one ewe who is a croucher and squats as I attach the machine.

After the first twelve are milked and the teats dipped with a disinfectant to prevent mastitis, I open the headgates and they file out one by one. I love this part getting to see each one walk across the platform to the exit door. When they are all done (40 this year), they walk back to the field, single file, my band of beautiful milk-sheep.

As you see, I am completely smitten by these wonderful animals. They give me so much. I can't imagine farming, milking, cheese-making without them.



I came to sheep dairying in a roundabout way. I had always wanted to farm but I didn't want to be a dairy farmer and I didn't think I would like sheep very much. My brother, Harry Kelley, and his partner, Jimmie Londagin, had started an Icelandic flock on a rental farm in upstate New York, with the plan to milk them and make cheese. I started driving over from Connecticut to help and fell hopelessly in love with these sheep. When they needed to move we went in together on this farm in the Catskills. We sold our milk to Old Chatham Shepherding Company for the first few years while building up the flock and developing a cheese-making business of our own (which I'm just starting now!). Harry and Jimmie have since moved to Massachusetts and will be dairying there also. So now I am an Icelandic sheep dairy farmer and loving it.

I know that several of you are already milking a few sheep for home use and cheese-making. For those of you interested in milking your own Icelandics commercially, I have pulled together some information that might help.

First, you might say, why milk sheep? Sheep are milked in most parts of the world for their wonderfully rich milk. In many countries more sheep than cows are milked. Sheep and goats can live in areas that can't support cows. Sheep milk is very nutritious and easier to digest than cow or goat milk. It is ideal for cheese-making and many of the worlds best gourmet cheeses are made from it (Roquefort, Manchego, the Pecorinos, too many to mention). My girls give very rich milk that makes a fabulous cheese.

Sheep dairying is easier on the land and environment. This is especially important to me since I am trying to farm holistically, caring for the land responsibly. I don't have any manure problem, like many cow dairies do, since my girls distribute it on the fields quite well by themselves. We are a seasonal dairy, starting with the spring flush of grass and ending in the early fall, as the fields are beginning their winter resting period. I rotationally graze to enhance my pastures.

A sheep dairy is easier on the farmer's bank account. My Icelandics don't need grain to produce well so I don't need to grow a crop or purchase and haul grain from elsewhere. My dairy parlor and milk room were set up at a much lower cost than the average small cow dairy. My sheep (in my case, Icelandic and some experimental Icelandic/East Friesian and Icelandic/Lacaune crosses) cost less to purchase than dairy cows. A sheep produces less milk than a cow does, of course, but that milk makes much more (and better quality) cheese, pound for pound, than cow or goat milk and you can pasture more sheep per acre than cows.

The market for sheep cheese is excellent. Artisan or handcrafted cheese is in great demand in most metropolitan areas. The US imports huge amounts of sheep's milk cheese and can easily support a vibrant US sheep cheese/yogurt market. There are now some commercial cheese makers that buy sheep milk that is shipped frozen. (Note: I'm not convinced that you can make a living selling fluid milk, though. You would need to be milking a very large number of sheep, with a much higher investment of time and money to make a profit. A value added product like cheese or yogurt seems the way to be profitable in sheep dairying.)

Why milk Icelandic sheep? I don't need to sell you on Icelandic sheep. If you get this newsletter, you know why - because they are the best, most versatile, hardiest, prettiest, smartest sheep on the planet - plus they have such interesting personalities. My girls live outside year round, lambing on pasture as the grass comes in, and only coming to the barn to be milked. In addition to high quality milk, my sheep provide wonderful fleeces that are a good additional income as is the gourmet quality lamb, which we sell as grass-fed (it makes a big difference in our markets).

The traditional European milk sheep is the East Friesian (Lacaune in France). They produce large amounts of milk (but their milk records are taken from sheep getting a fairly high grain input to produce that much). They are traditionally winter housed and lambed in the barn and consequently require more care than my Icelandics. They seem to have a higher percentage of lamb losses to pneumonia but part of those losses could be because of being raised in confinement. They can, however, be bred out of season, which is important for year-round dairies.

Old Chatham measured components of our milk when we sold it to them for cheese-making; it was higher in solids than their East Friesian ewe milk, even with their high input of grain/TMR. It's analogous to comparing the milk from Holsteins (large quantity/less solids) to Jerseys (lower quantity/higher solids). The cheese-maker at Old Chatham said that our milk was of the highest quality and easiest to make cheese with. I think this is because we practice rotational grazing and our sheep can flourish on grass alone!

There has been some controversy about calling Icelandics dairy sheep. They are my dairy sheep and I am very pleased with what they are giving me. The milk does seem to want to be cheese. As a new cheese-maker I expected to have a more difficult time developing a decent cheese. I don't think it's beginner's luck that the cheese is so good. I think it is because of the sheep we milk

and the way we are caring for them. They are very efficient at converting grass to high quality milk, which I then convert to outstanding cheese.

For those of you who want specific numbers, I can give you a few on my sheep. According to the British Sheep Dairying Association (www.sheepdairying.co.uk), sheep typically give 18.3% solids (usually with grain or TMR); mine give 17% early season, increasing to 22% late season, without grain inputs. We also had low somatic cell counts. I didn't start measuring output until the end of lactation, when they were producing much less milk and I got an average of 1.5 lbs. This is lower than the traditional dairy breeds, but for late season, on a grass-based operation, its very good. I still have eight girls that are in milk despite the late season (October already!) so next year I plan to dry them off later, just giving them enough time to flush for breeding.

If any of you are interested in milking your Icelandics and/or making cheese, I would be happy to talk to you about how I'm doing it and what has worked (or not) in my experience. You can reach me at 518 634-2196.

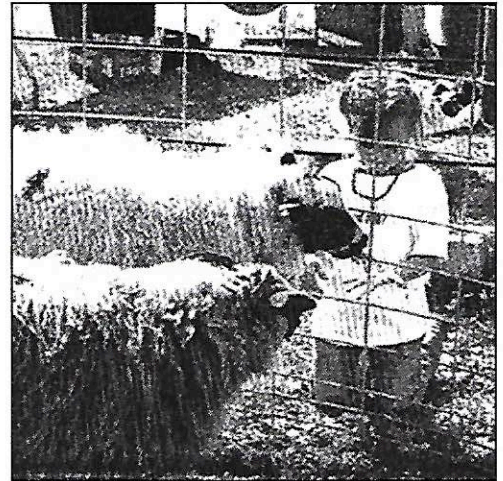
It is an early fall evening. Milking is done for the day and the sheep are on their way back to their pasture. As the sun is setting over the Catskills, I watch my girls walking single file, in the golden light, and again I feel the joy of working with these wonderful creatures. ■



The Sheep Dairy Diaries

Charlene Barkus

Charlene's ewe "Victoria" says "hello" to a young visitor at the local dairy farm's annual "Open Dairy Farm" event. Charlene makes products from her sheep's milk and is invited each year to participate in Shetler's farm festival by selling her products and showing her sheep to visitors at the farm. Victoria and several other ewes were featured in the local newspaper's write-up about the event.



When I was first asked to write an article (a year ago) on the "Dairy END" of Icelandic sheep, I hesitated. I didn't think I had enough experience or information to pass along. So, instead, I wrote about "Milking my Icelandic Sheep" and the experience I had as a new shepherdess with the different sized udders, mastitis, different temperaments of the sheep I was milking and not having any REAL milking equipment to work with, etc. As time went by, I did keep Daily Dairy Diaries of the events and my milk harvest. This allowed me to have on paper which sheep did better than others.

I would like to share some of my milking records and experience with you in this article.

When first searching for the breed of sheep I thought was right for me, it took some time, but I finally decided on Icelandics. They had several aspects that interested me. Size was one of them - I wanted something I could handle myself; I chose horns instead of polled because, for me it makes my work much easier.

I loved the Icelandic fleece and all the colors. The option of milking my sheep was a plus for me because I wanted to make cheese, yogurts and soap. I also liked the idea of no tails to dock and how primitive they are. They are what the Viking actually had to work with and the nostalgia of it all was very appealing to me. In America we are so used to taking something and "MAKING IT BETTER" that sometimes a lot of history and benefits are lost. I wanted this breed because it really is primitive and basically "untouched." That was my personal preference.

I liked the different sizes and colors and personality of each of my sheep and I worked with them instead of forcing them to work with me.

When I first started milking, I got (with no previous experience) what I thought was a lot of milk that day. The next day didn't seem as much. So I decided to keep a detailed diary so I could talk with other people and compare, to see if I was doing something wrong (or maybe right).

My diary started out as follows:

Ewe	AM	Noon	PM	Total
#1 (good udder, easy to work with)	10 oz	11 oz	12.5 oz	33.5 oz
#2 (tricky udder)	8 oz	12 oz	13.5 oz	33.5 oz

Over cast day 48 degrees

#1	10.5	8 oz	7 oz	25.5 oz
#2	11.5	8 oz	6 oz	25.5 oz

Cold rainy about 40 degrees

#1	13 oz	15.5 oz	11.5 oz	40 oz
#1	12	6	11 oz	39 oz

Sunny day, put everyone out on pasture 60 degrees out

This is an example of how I did my charts. I don't know if others use the same method or even milk 3 times a day. I did because to me the udders looked very large. Both these particular ewes had lost their lambs, so I thought it would be good to practice milking on ewes that were not nursing.

As you can see by the weather conditions I recorded, what a difference in milk production, from grass hay to pasture - with sunshine to cold and rainy. It just never occurred to me how much the weather had to do with this.

I also took some of the Icelandic sheep milk to the neighbors dairy farm to be "TASTE TESTED" (they have had dairy cows for 20 years now and are bottling "All Natural Milk" at their family farm). They tasted my sheep's milk and said it was very good and equivalent to their "1/2 and 1/2" that they sell. Their herd is made up of Guernsey and Jersey cows. They also told me that weather does have a lot to do with milk production. I don't know why that should surprise me. I know I feel much

Ewe	AM	Noon	PM	Total
#1	15.5 oz	8.5 oz	9.5 oz	33.5 oz
#2	14.5 oz	10.5 oz	7.5 oz	34 oz
#3	13 oz	8 oz	7 oz	25.5 oz
#4	15 oz	10 oz	9.5 oz	34.5 oz

Overcast day, about 50 degrees

#1	16 oz	7 oz	12.5 oz	35.5 oz
#2	15.5 oz	9 oz	10.5 oz	34.5 oz
#3	14.5 oz	8 oz	12.5 oz	35 oz
#4	17 oz	9 oz	13 oz	39 oz

Sunny day about 65 degrees out on pasture

These are only a few entries to show what a difference can happen over night in milk production. I am not a large professional dairy and really knew nothing when I started. I didn't even know if this was a lot of milk or not. So I went to the internet to look up dairy sheep. I did find a website in Europe that had a sheep dairy and a cheese business. They had very good information with charts also. Unfortunately I can not find that website now but I did write down what he had written for milk production.

Average Milk Production:

From a meat sheep Ewe - 1.6 qts. a day

Dairy Ewe - 3 qts. a day

He did have a wonderful cheese business going was using a mixed breed flock. He had not chosen ONE BREED over another for his program but rather PERSONALITY of the animal.

That's what I liked about his operation because - basically that was what I was doing too.

Those of you who have met my "Friendly Flock" know "Victoria" and her little "Secret" and of course "Apple" with their "let me up in your lap" personality know how much easier it is to work with those types of sheep personalities.

Some of these girls even jump right up onto the milking station because they know they get a little more attention and "CORN" (which I have to admit I was not consistent with and that reflects a lot in your milk production for the day also.)

The ewes I had chosen to milk were chosen for their personalities and not so much for size and shape of udder. I was glad to see others were also doing this; I felt like I was on the right track anyway.

I really like the differences in the Icelandic sheep, to me that is what makes them unique. So I have learned to work with them as individuals. As you can see by my daily records I was also pleased to know the "Quarts Per Day" was right in line with the average milk production and this is just from my first year of milking with no prior experience. It may not look like a lot of milk but keep in mind, I did not have any regular routine or feeding schedule or even good fields at that time.

This season was much better and I had much higher oz. and qts per day per sheep - much closer to 2 qts. and next year will be even better as I will have all my pastures replanted with a rotational grazing program in place. This will make such a difference. I cannot expect to get more out of these girls if I'm not putting more into them. So I am excited to see what the quarts per day will be next season per sheep.

I would encourage anyone who is wanting to have a few ewes for milking to just try it. I did not start out with fancy equipment or even the knowledge, but time and experience has taught me a lot, so do not get discouraged because you can do it.

Visit my website at www.darnitchars.com to see the different products I am making from my sheep milk.

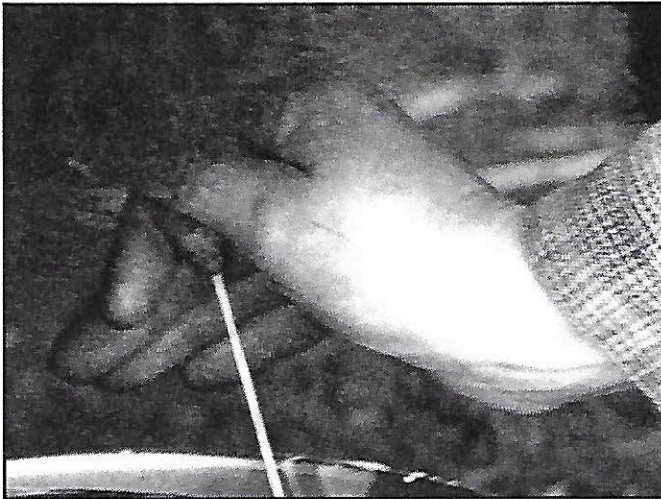
Editor's Recommendation

For an excellent internet resource for articles on sheep husbandry,
as well as sheep dairying,
be sure to go to:

http://www.uwex.edu/ces/animalscience/sheep/Publications_and_Proceedings/res.html

Milking Sheep

Corinna Szymoniak



"You do what???" is the common response we get when people hear we milk our sheep.

For most it seems to be difficult to believe the milk is not just nutritious but delicious as well. Coming originally from Europe, we were familiar and comfortable with sheeps' milk and products to begin with.

The main reason we chose to milk sheep was our children. Sheeps' milk contains up to twice as many of the minerals like calcium, phosphorus and zinc and the B group vitamins than goats or cows milk. It is much higher in total solids as well, which allows for a higher yield when making cheese.

We make yoghurt, cheese and ice cream. The yoghurt is wonderful - thick and creamy, used almost exclusively in Greek cooking. My favorite is to mix it with walnuts and top it with honey, which is a common dessert found in Greek restaurants in Europe. Always a special treat is the ice cream, very rich and wonderful; it does not last long in our house.

This spring and summer our two Icelandic ewes supplied us with the milk we needed. The girls had not been milked before, but since I had experience with goats and East Frisians, I felt confident. It ended up being a bit more challenging then we thought it would be. Our ewes were not docile at all and probably will never be.

For the first few weeks my husband would hold onto the ewe while I milked her right in the paddock, which was the least stressful for the ewes. We did not use a milk stand because I

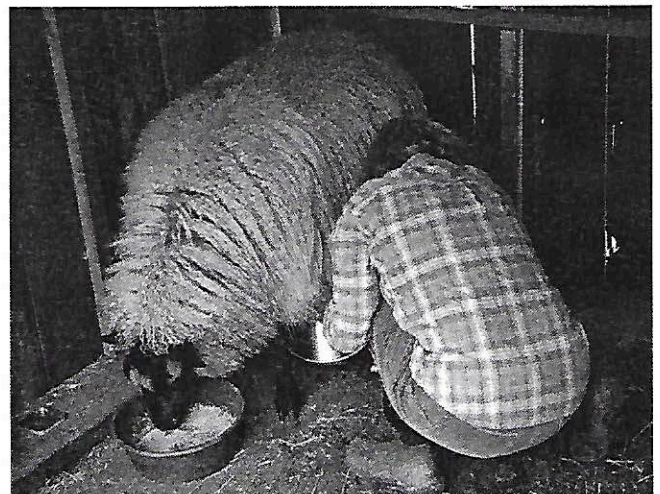
was afraid they would fall off and hurt themselves. After awhile they got used to the routine, so I started milking them by myself, using a halter to have some control. The first two months I separated them from the lambs at night and milked in the morning. Then moms and babies were reunited for the day.

Also we only milked once a day; we had about two quarts of milk to work with. It was enough to experiment with and still have plenty to drink for a family of five (one baby). We use the milk raw. I strain it through a disposable filter and chill it right away. Since the milk gets processed or consumed within a day or two I never had a problem. Of course I always wash the udder and my hands thoroughly before milking.

By midsummer we started milking morning and evening, keeping the ewes apart from the lambs for good.

With every milking we feed them a yoghurt container full of soybean meal, which helps to keep them happy during milking. An herbal dewormer is mixed in their feed weekly. Other than that they are exclusively pasture fed. I started to dry the girls up mid-September, so they have some time to rest before being bred again. Currently we are looking for a couple more ewes to expand our milking potential for next year. Often the "you do what?" turned into "do you sell any?" after trying the milk or cheese.

We plan to further explore the promising business of sheeps' milk products and encourage everybody with an interest in milking their sheep in trying to do so. ■



So are you are thinking about milking your sheep yet?

Here's a list of places to get good information about sheep milking

Mike Kelley

First and foremost, make friends with your dairy inspectors. They are there to help you, not to cause you grief. Meet with them prior to starting anything. Find out what your state regulations are. They often can put you in touch with suppliers of equipment, people running other small dairies, and in general can be very helpful in the planning stage. This will also save you from investing your money and time doing something wrong. If your local inspector isn't used to sheep or goat dairies it may be more difficult for him/her to get information for you (or even to be able to get regulations that make sense for you). Don't despair. There will be someone in the state offices that can find out for you. It is their responsibility to advise you correctly.

Join the Dairy Sheep Association of North America, www.dsana.org.

Go to the Great Lakes Sheep Dairy Symposium (in Wisconsin this year Nov 4-6) Information on DSANA site (see above). The first day is focused on beginning sheep dairying. There are many great classes and an opportunity to meet and talk to other sheep dairy farmers.

If your state has a sheep and/or goat farmstead/artisan cheese-making guild, call them up. You can probably go to a meeting and meet others who are milking and making cheese from small ruminants. The New York State Cheese Makers Guild has sponsored classes and even helped foot the cost of having an expert come to my farm to advise me. Go to farmers markets and ask yogurt/cheese makers and fluid milk sellers where they get their milk and how they work with inspectors.

The most useful compilation of information I found was The Small Dairy Resource Book, put together by the Hometown Creamery Revival Project. It was the product of a SARE grant. It is now out of print but can be downloaded from www.sare.org/publications/dairyresource.htm. It gives very useful information about farmstead dairying. My librarian (a real gem) got many of the books it recommended so I could check them out before ordering and spending any money on them. They have lists of suppliers and equipment information also. Very helpful!

Vicki Dunaway, who was the project coordinator for the Small Dairy Resource Book, also edits a quarterly for small farm dairies/processors called Creamline. Info at www.smalldairy.com or you can order it from Creamline, PO Box 186W, Willis, VA 24380 (\$25.00/yr).

Vicki also manages a website for small dairy farmers and cheese-makers at the www.smalldairy.com site. It has extensive links to many relevant sites.

The University of Vermont Center for Sustainable Agriculture runs a Small Ruminant Dairy Project. They have an extensive list of resources (in VT and beyond) online at www.UVM.edu/sustainableagriculture/SRDResources.html.

Practical Sheep Dairying by Olivia Mills is the book on the subject. She was very instrumental in bringing sheep dairying back to the UK and in the formation of the British Sheep Dairying Association. She was also very involved with the beginnings of North American sheep dairying and small farmstead cheese-making. The book is out of print but perhaps you can find one on the used bookseller web sites.

dairysheep.yahoogroups.com is an on-line group list which is focused on sheep dairying and cheese-making. You can get all kinds of information reading it and you can often get help with specific questions. There is much experience and knowledge to share on this list

Goat Management

Nutritional Value Of Dairy Products Of Ewe And Goat Milk

George F. W. Haenlein Cooperative Extension Dairy Specialist University of Delaware

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Summary

The composition of ewe and goat milks varies over a wide range because of genetic differences between species, between breeds within species and within breeds. These genetic differences have considerable influences on the cheese-making process and on human digestion of these milks. Furthermore, the stage of lactation, daily variation, season, parity, type of diet, physiological status, health of the udder and processing procedures change the contents and levels of major and minor constituents in the milks and its products. This provides, therefore, considerable potential to tailor-make ewe and goat milks according to the needs and preferences of consumers, and to provide an alternative to cow's milk, where this is economically or medically advantageous. But more research documentation is needed in this area.

Introduction

The aim of this paper is to focus on properties and attributes of the milk and dairy products from ewes and goats as they contribute to human nutrition.

The composition of the milk of ewes and goats and factors affecting it has been reviewed comprehensively (Parkash & Jenness, 1968; Jenness, 1980; Anifantakis, 1986; Juarez & Ramos, 1986). Further important contributions have been published by Anifantakis et al. (1980), Merin et al. (1988), Casoli et al. (1989), Voutsinas et al. (1990), Espie & Mullan (1990), Simos et al. (1991), Haenlein (1992), Peeters, et al. (1992), Park (1992; 1994), Sakul & Boylan (1992), Agnihotri & Prasad (1993), Bindal & Wadhwa (1993), Quiles et al. (1994), O'Connor (1994), Kalantzopoulos (1994) among others. However, only a few deal with the relation to human nutritional needs, which has been pointed out by Charlet (1981) "...the variation of composition of milk has not received the attention it deserves, except by a few workers". This is still largely true today and a 1st World Congress of Dairy Products in Human Health and Nutrition gave ewe and goat milk no recognition and deserved coverage, when it was held in Spain in 1993 (Serrano Rios et al., 1994).

Interest in the original properties of milk, as it comes from the farm, should be high, when it is consumed as fluid whole milk, partly skimmed or as yogurt. Dairy products, mainly cheeses (except those made from whey) contain only the casein and fat fractions of milk, but no whey proteins, nor lactose and soluble minerals, so interest may be limited here to the original composition of casein and fat only, and changes during cheese fermentation. Ewe milk, depending on region and economic conditions, is mostly

processed into cheeses and yogurt. Goat milk on the other hand, in some countries, is consumed as fluid milk, even on a commercial basis, besides being processed into dairy products. Therefore, the characteristics of all components of goat milk are of considerable market interest.

Interest in the nutritive value of ewe milk is concerned mostly with the yield and evaluation of its cheeses and yogurt. Interest in the nutritive value of goat milk includes all fractions and how they may differ from those in the milk of other species. In order to sell goat and ewe milks and their products for human consumption, their needs and tastes, it is of considerable market advantage to know the factors that cause milk composition to vary and to what extent. This will be even more important in the future, when it becomes better known how to change original farm milk composition by manipulating e.g. the feeding of goats and ewes in order to tailor-make milk to the needs of diet conscious and disease afflicted consumers and their children, and to satisfy consumers with higher incomes, who have developed a sophisticated connoisseur taste for goat and ewe milk products.

Ewe and goat milk has considerable economic importance in some countries. The Mediterranean region produces 66 percent of the world's ewe milk (Table 1) and 18 percent of the world's goats milk (Table 2) (FAO, 1994). Of all milk produced by cows, buffaloes, ewes and goats combined, ewe milk makes up 1.5 percent and goat milk 2.0 percent of the world total, but in the Mediterranean region it is 11.7 percent and 3.3 percent, respectively. In at least 7 countries, including Greece, ewe milk or goat milk is more than 20 percent of all milk produced; and in at least 10 countries the combined production of ewe and goat milk is more than 20 percent of all milk in that country (Table 3 and 4) (FAO, 1994). Some countries, including Greece, have more than 1 ewe and goat combined per person (Table 3) and at least half of the countries with leading ewe and goat populations have more than 1 ewe and goat combined per hectare permanent pasture land, again Greece included.

The significance of ewe and goat milk for human nutrition in these countries varies widely (Table 4) from less than 5 kg all milk per person per year to more than 450 kg, assuming that the FAO statistics, which are very difficult to obtain in some countries, approximate the real conditions. The food supply for protein or calcium from all animal sources, including milk and dairy products, also varies greatly between these countries (Table 4), and averages in many countries far below the minimum daily requirements of 65 g protein and 800 mg calcium (NRC, 1968). This gives much support to the contention that improved ewe

and goat milk production is one of the best strategies to relieve human starvation, undernutrition and malnutrition and therefore has great market growth potential, incentive and justification, especially in areas where pasture conditions, climate, mountainous terrain and economic conditions favor small ruminants.

The market of ewe and goat milks and their products has essentially three aspects:

home consumption and self-sufficiency,

gourmet menus and natural foods preference,

medical needs.

Knowledge of the nutritive values of ewe and goat milks, what causes them to be different or to change, and comparison with cow's and human milks will help each of these markets. Some evidence from recent research with ewes and goats comprises this review.

Factors Affecting Milk Composition

Genetics

Average genetic composition differences between species, ewe versus goat versus cow, and compared to human milk are considerable (Posati & Orr, 1976) in absolute and relative terms (Table 5, 6). Ewe milk is generally much higher in solids contents than goat, cow's or human milks, but composition categories and contents of individual minerals, fatty acids and amino acids vary in different directions between the species, and without relation to higher or lower solids contents. The high solids content of ewe milk makes it generally superior to goat or cow milk for processing into cheese and yogurt, because of higher yield and firmer processing quality without additives. However, this must be balanced in economic terms against lactation milk yield and lactation length of milking ewes, which is much less and shorter than for goats or cows. Nevertheless, published average data of milk of different species have to be used with caution, because within each species there are great genetic differences due to breeds and selected families, which can be used to market advantage.

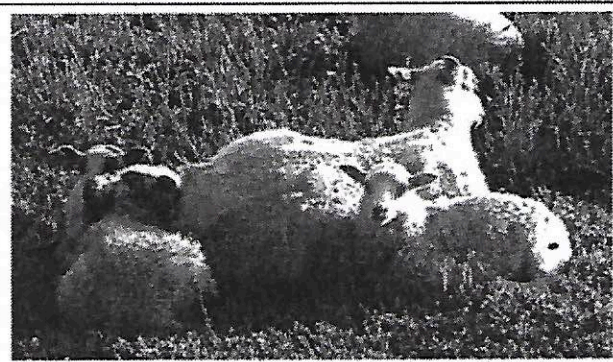
Genetic differences in milk composition within species have a wide range for ewe milk fat from 4.6 percent to 12.6 percent (Casoli et al., 1989) and an average of 7.1 percent (Anifantakis, 1986); for ewe milk protein from 4.8 to 7.2 percent and an average of 5.7 percent, depending on breed. Other components follow these ranges. It must be emphasized that cow's milks, when ewe or goat milks are compared with them, also have a wide composition range due to breeds, e.g. average Holstein milk fat at 3.4 percent versus average Jersey milk fat at 5.1 percent, and milk protein from 3.3 percent to 3.9 percent (Anifantakis, 1986), besides other breeds. Goat milk composition likewise can have great differences, depending on breed, e.g. for milk fat from 2.3 percent to 6.9 percent (Juarez, 1986) and an average of 3.3 percent; for goat milk

protein from 2.2 percent to 5.1 percent and an average of 3.4 percent. A major portion of this variation includes negative correlations between milk yield and composition, i.e. low yields have higher contents and vice versa.

Within species within breed one can identify through selective breeding considerable differences in milk composition. This includes genetic polymorphisms of milk proteins, which have commercial importance in cheese making, because they influence rennetability, cheese yield and flavor (Remeuf & Lenoir, 1986; Martin, 1993; Chianese et al., 1993; Heil & Dumont, 1993; Kalantzopoulos, 1994), and which have potential but yet poorly understood values in human nutrition (Haenlein, 1991). Genetic polymorphisms of beta-lactoglobulin, alpha-s-1-, beta- and kappa-casein affect firmness and viscosity of yogurt, rennet coagulation time, curd syneresis, heat stability, contents of casein, total solids, phosphorus and pH. Amino acid substitutions have been identified for the DNA sequences of caprine, ovine and bovine milk protein genes (Martin, 1993; Folch et al., 1994) and have been related to the different behavior of milk proteins in processing.

Some goat milk has low casein contents and unsatisfactory rennet coagulation ability, which affects cheese yield (Remeuf & Lenoir, 1986; Ambrosoli et al., 1988). Goat milk casein has the same four proteins, alpha-s-1, alpha-s-2, beta and kappa, as cow's milk casein, but genetic differences by breeds and individuals in alpha-s-1 casein range quantitatively from zero or "null type" (O) to "low types" (F, D) and "very high types" (A, B, C), with intermediate classes (E). Some goat and sheep breeds differ significantly in the frequencies of the polymorphic loci of milk protein types (Jordana et al., 1995) (Table 7), with considerable processing and nutritional consequences. Low alpha-s-1 casein types of goat milk have shorter coagulation time and weaker resistance to heat treatment than high types. Curd firmness at 30 minutes of high type milk is greater than that of low type milk. Contents of total solids, total proteins, casein and phosphorus are higher in high type milk and pH is lower. Longer coagulation time of high type goat milk is due to alpha-s-1-casein delaying curd formation by trapping calcium ions and withdrawing them from the proteolysis of kappa casein. High type has higher cheese yield, better curd firmness, which is associated with lower pH. Despite longer coagulation time, goat milk of the high alpha-s-1 casein type is more suitable for cheese making because of firmer curd, higher casein content, less intense goat flavor and smoother cheese texture, yet it may be that low type has the advantage in human digestion. Beta-casein types also affect cheese making properties of goat milk (Chianese et al., 1993) and alpha-s-1- and beta-casein loci need to be considered together in selection. Sheep's milk also has polymorphisms in its milk proteins, but this research is just beginning.

Amino acid substitutions in milk proteins can also be responsible for flavor and its intensity (Rystad et al., 1990). The amino acid threonine is considered the most important precursor of acetaldehyde, which is the main volatile aroma



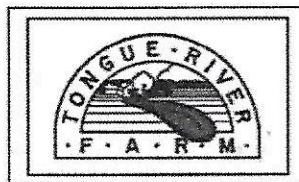
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compound in yogurt. The higher level of glycine in goat milk compared to other species milks may reduce acetaldehyde production from threonine by inhibiting the enzyme threonine aldolase. Ultrafiltration removal of glycine increased acetaldehyde production in goat milk. Addition of threonine resulted in increased acetaldehyde production in goat or cow's milk, but goat milk had less. Goat milk with added threonine had less production of lactic, more pyruvic, acetic and less orotic acids; and there are other amino acid differences between goat and cow's milk (Rystad et al., 1990).

State of Lactation

Within species within breed it is the stage of lactation, regardless of species or breed that has the greatest influence on milk composition. Days in milk during lactation regressed on ewe milk component contents had coefficients up to 0.71 (Casoli et al., 1989). Many components in ewe or goat milk as in cow's milk, especially fat and protein, are high in colostrum in early lactation, much lower thereafter until they rise again markedly at the end of lactation, when yields are low (Anifantakis & Kandarakis, 1980). Fat contents in goat milk changed from 2.7 percent in mid-lactation to 4.6 percent during the last week 42 of lactation, protein contents from 3.0 percent to 4.2 percent (Voutsinas et al., 1990). Mineral contents also increased with stage of lactation, Ca from 135 to 150 mg/100 g; P from 99 to 122; Na from 50 to 56; Mg 13 to 15; except K decreased from 170 to 144; and citrate from 145 to 81 mg/100 g.

Daily Variation

Between morning and evening milkings on the same day the gross composition of milk may also change (Simos et al., 1991), which again may be confounded with milk yield levels, when the milking interval between evening and morning milking has more or less hours than between morning and evening milking. Fat contents of evening goat milk averaged 5.1 percent after 14 hours of milking interval, morning milk 5.3 percent after 10 hours, total protein contents were 3.54 percent versus 3.58 percent, and total solids were 13.94 percent versus 14.30 percent, respectively. In studies with milking intervals of 8 and 16 hours the differences were 0.39 percent fat and 0.05 percent protein, respectively (Merin et al., 1988).

Season

There are also clear seasonal differences in milk composition of the major and minor components (Renner, 1982), but they are confounded with climate and diet effects. Winter climate can affect milk yields and composition, and both are negatively correlated. Winter feeding is providing usually different proportions and qualities of grazing, hays, silage and supplements, which influence milk composition considerably. Milk C18:0, C18:1, C18:2, C18:3 fatty acids have been found to increase in summer, while C4 to C16 fatty acids were reduced significantly. The seasonally limited production of ewe and goat milk has stimulated interest in overcoming

this handicap by various means, including hormonal induction of lactation (Alifakiotis et al., 1980). Normal milk contents of fat, lactose, chloride, total solids, acidity and pH have been obtained.

Parity

Differences due to parity, number of lactation or age of animal can be significant in gross milk composition, but this is also confounded with milk yield levels (Casoli et al., 1989). Average fat contents of ewe milk changed linearly from 1st to 6th parity from 6.8 percent to 7.4 percent and total protein contents from 5.8 percent to 6.2 percent for the Massese breed in Italy. Parity seems to have little effect on contents of amino acids, fatty acids or minerals (Casoli et al., 1989).

Type of Diet and Physiological Status

Regardless of genetics, the composition of the daily diet and its amount in relation to production requirements can cause significant changes in milk composition (Moran-Fehr, 1981; Haenlein, 1995). In general terms, 3 percent of bodyweight is a minimum requirement of daily dry matter intake for most goats, but high producers will need at least 5 percent. In order to cover nutrient needs of high production, the energy and protein density of the daily feed intake must increase, because of the limitation of the rumen in volume capacity. Roughages like grass, hay or silages are mostly low in energy and protein density because of high fiber and/or water contents. Starchy supplements like cereal grains or fats and fatty seeds from sunflowers or roasted soybeans increase the energy density of the daily diet, and oil meals increase the protein density. Goats and ewe like other ruminants require a daily minimum of long fiber in the diet to prevent acidotic rumen conditions, which lead to fatal parakeratosis and enterotoxemia, or at least to laminitis, significantly depressed milk fat contents, but also possibly increased milk protein contents (Merin et al., 1988).

A more intensive feeding system can be appropriately devised with a complete diet of hay, silage and concentrates mixed together loose (TMR, Total Mixed Ration) or in a pelleted or cubed form (Cavani et al., 1991). This causes usually higher milk yields, changes in milk fat and protein contents and also different cheese making properties.

Energy shortage in the diet can change the fatty acid composition of milk fat towards more medium-chain fatty acids, while daily milk yield may decrease and fat content increase (Moran-Fehr, 1981). When grain concentrate supplementation makes up more than 50 percent of the daily dry matter intake by goats, decreased chewing, less rumination and a shortage of salivation of rumen contents occurs (Kawas et al., 1991). To prevent a decreased rumen pH, the feeding of buffers like sodium bicarbonate and magnesium oxide is beneficial. This has been shown in several studies, where yields were even increased while restoring milk fat contents to normal levels (Hadjipanayiotou, 1988). Increasing energy density by

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adding fat within narrow limits to the diet, can increase yield of milk, fat, total protein and casein contents (Moran-Fehr, 1981). Also the type of protein in the diet and its rumen degradability can affect milk yield, contents of fat, protein, and processing properties (Andrighetto & Bailoni, 1994).

Nutritional physiology and endocrine status of the animal affects milk yield and composition over short or longer time periods. This has been demonstrated for the effect of estrogens during estrus (Haenlein & Krauss, 1974). Somatotropin also will increase milk yield, milk fat content, short-chain and medium-chain fatty acids significantly, while decreasing milk protein percentage, long-chain fatty acids and net energy balance (Disenhaus et al., 1995).

Udder Health

A widely accepted rapid monitor of udder health is the somatic cell count in milk. However, milk secretion in goats is apocrine, while in cows it is merocrine, which explains why goat milk may have very high counts of somatic cells, especially in late lactation milk or in the last strippings of milk, without any relationship to mastitis (Park & Humphrey, 1986; Haenlein, 1993). In cow's milk it has been demonstrated that the relative and absolute casein content is related negatively to somatic cell counts (Haenlein, 1974). Generally, subclinical or clinical mastitic infections cause the milk contents of casein, lactose and cheese yields to decrease, milk serum albumin, immunoglobulins and salt (NaCl) contents to increase.

Processing

Even before cheese precipitation from milk and the effects of fermenting of cheese, the various methods of processing, heating and freezing can have profound influences on milk composition. Heating is applied during pasteurization, UHT processing, condensing and powder production, which will denature milk proteins to varying degrees and affect flavors (O'Connor, 1994). Freezing is of economic interest because of the seasonal nature of goat and ewe milk production, and because these milks have greater economic importance than cow's milk in some countries (Kalantzopoulos, 1994) (Table 1, 2, 4). During frozen storage, oxidation of ewe milk occurred and free fatty acid contents increased because milk lipase was not completely inactivated (Anifantakis et al., 1980). Proteins and bacterial counts may remain stable, and taste and flavor scores do not change. In freezing of cheeses the pH and proteolysis may change (Fontecha et al., 1994). Fermentation during yogurt processing and cheese ripening also causes significant changes in the composition of the products due to proteolysis, lipolysis, glycolysis, development of flavor compounds and liberation of non-protein N-compounds, free amino acids, free fatty acids and ammonia as extensively documented by Anifantakis (1991) (Table 8).

Comparative Nutritional Adequacy

When milk is consumed as it becomes available from the

processing, a principal question in the pediatric and popular literature is how adequate is that milk for infant or general human needs (Schrander et al., 1993; Andersson & Draussin, 1993; O'Connor, 1994). It must be understood that in general:

(1) milk is the main and hard-to-replace source of dietary Ca in human nutrition regardless of whether it is from ewes, goats or cows;

(2) milk was never meant to be an adequate source of some minerals like Fe or vitamins like C, B12, or folate, which are routinely and cheaply supplemented to daily infant diets from other sources anyway.

With that understanding, milk from ewes or goats can meet at least as well or better significant portions of the daily nutrient requirements of humans (Mack, 1953; Desjeux, 1993) (Table 9). A typical serving size of milk is 1 cup with 245 ml content, which is used as a standard in the USA for comparison of nutrient intake (Gebhardt & Matthews, 1991; NRC, 1968). The minimum daily requirements of 800 mg calcium, not considering the higher needs of pregnant and lactating women or adolescents, are barely met by 3 cups of cow's milk, while goat milk covers this amply and of ewe milk only 2 cups would be required. The same is true for meeting the needs of essential amino acids, except for methionine, phenylalanine, magnesium, thiamine and niacin, as far as requirements are known. Of course, equivalent amounts of yogurt or cheese can be substituted for meeting nutrient needs with milk.

Unique Nutritional Values

Beyond meeting daily nutrient requirements, it is of special interest that goat and ewe milks have unique properties, which distinguish them from cow's milk and make them a valuable alternative not just for infants but also for adults and especially nursing mothers (Baldo, 1984; Host et al., 1988; Razafindrakoto et al., 1993) (Figure 1). Growing interest in goat milk has produced some publications, which document unique nutritional values of goat milk compared to cow's milk (Mack, 1953; Kosikowski, 1985; Haenlein, 1992). Similar research about ewe milk properties is still needed (Steinkamp, 1995). The high solids content of ewe milk enables production of superior yogurt compared to cow's and most goat milks. In order to produce acceptable yogurt viscosity from cow's milk, firming agents or as much as 5 percent skim milk powder are usually added, which however can increase greatly the lactose content of yogurt to undesirable levels in view of today's consumers' concern with lactose intolerance (Kosikowski, 1985).

The incidence of cow's milk allergy has been found to be about 8 percent or even more in 1-year old infants (Host et al., 1988), but goat milk can be a successful treatment in most cases of direct or indirect cow milk allergy (Walker, 1964; Brennenman, 1978; Grezesiak, 1989). Goat milk fed to undernourished infants or children with digestive malnutrition has been found to be at least equal or even a

superior substitute to cow's milk (Hachelaf et al., 1993; Razafindrakoto et al., 1993) (Figure 1).

A well-known difference for goat milk is the predominantly smaller size fat globule compared to cow's milk, which has been credited with easier digestion (Fevrier et al., 1993). Less well appreciated is the qualitative and quantitative difference in milk proteins of cow's versus goat milk, especially alpha-s-1-casein in goat milk with its softer curd formation compared to cow's milk (Ambrosoli et al., 1988). This may be the reason, why the popular literature is full of reports of benefits derived from better digestion of goat milk compared to cow's milk.

An especially interesting difference of ewe and goat milks compared to cow's milk is in their basic milk fat composition (Posati & Orr, 1976; Babayan, 1981) (Table 5). Goat and ewe milk exceed cow's milk significantly in most short, medium chain, mono-unsaturated, poly-unsaturated and essential fatty acids (Table 5 and 6), which are valuable to today's health conscious consumer. Medium chain fatty acids (MCT) (C6 to C14), in particular have different human metabolic properties than long chain fatty acids. MCT, especially caprylic (C8:0) and capric (C10:0) have become accepted treatment for patients with malabsorption symptoms, a variety of metabolic disorders, cholesterol problems and infant malnutrition, because of their unique roles of providing energy to the human metabolism instead of lipids to adipose tissues, and because of their ability to limit and dissolve serum cholesterol (Kalser, 1971; Tantibhedhyangkul & Hashim, 1989). The contents of essential fatty acids also differ in ewe and goat milks compared to human milk, which could be of significance to nursing infants (Wright & Bolton, Jackson & Gibson, 1989) (Table 5, 6, 9). It has been found that mothers of infants with atopic eczema had an abnormal composition in their milk fatty acid profiles, especially concerning linolenic acid (C18:3). Also it has been found that commercial milk formulae do not contain sufficient amounts of long-chain polyunsaturated fatty acids to cover the requirements of nursing infants. It can be predicted that the commercial natural foods and food supplements industry is soon focusing its efforts on the role of different fatty acids in human nutrition, and the goat and ewe milk industry may be well advised to join this market opportunity.

Conclusion

The composition of ewe and goat milk in relation to human needs and in comparison to cow's milk needs much more research in order to document their unique values, to justify their existence and the higher cost of producing these milks compared to cow's milk (Kosikowski, 1985; Steinkamp, 1995). Besides the differences in milk proteins, which have commercial importance in cheese making and medical significance in digestion and allergies, the considerable differences in milk lipid composition have not been studied much in relation to human nutrition. Therefore, goat or ewe butter, ghee and related products, with their enriched concentration of MCT and other fatty acids, have

considerable market potential (Hachelaf et al., 1993), and their unique roles in nutrition and medicine should be a thankful area for researchers to explore (Haenlein, 1992). To further establish the uniqueness of ewe and goat milks will go far in strengthening the small yet ancient dairy sheep and dairy goat industry not only in the Mediterranean countries but around the world. ■

Table 1. The world's leading ewes milk countries (> 100,000 t in 1993) (FAO, 1994)

Country	Ewes milk 1,000 t	of ewes production	%Ewes world in % of milk country (1)
France*	1,100	14.2	4.1
Turkey*	1,050	13.5	10.2
Iran	810	10.4	21.8
Italy*	650	8.4	5.8
China	630	8.1	7.8
Greece*	620	8.0	34.9
Syria*	515	6.6	37.3
Sudan	505	6.5	14.1
Romania*	390	5.0	11.7
Spain*	275	3.5	4.2
Algeria*	235	3.0	23.2
Afghanistan	200	2.6	37.0
Somalia	190	2.4	25.2
Iraq	175	2.2	33.0
Bulgaria*	138	1.8	8.7
Yugoslavia*	134	1.7	3.0
Mediterranean area*	5,107	65.8	11.7
World	7,766	100.0	1.5

Table 2. The world's leading goats milk countries (> 100,000 t in 1993) (FAO, 1994)

Country	Goats milk 1,000 t	of goats production	%Goats world in % of milk country (1)
India	2,220	21.6	3.5
Bangladesh	997	9.7	55.2
Iran	897	8.7	24.2
Pakistan	602	5.8	3.5
Sudan	565	5.5	15.8
Greece*	460	4.5	25.9
Spain*	430	4.2	6.6
France*	417	4.0	1.6
Somalia	385	3.7	51.0
USSR	350	3.4	0.3
Turkey*	304	3.0	3.0
Indonesia	184	1.8	28.8
China	178	1.7	2.2
Mali	161	1.6	42.7
Italy*	155	1.5	1.4
Brazil	140	1.4	0.9
Mexico	136	1.3	1.8
Algeria*	130	1.3	12.8
Mediterranean area*	1,896	18.4	3.3
World	10,294	100.0	2.0

(1) Includes all milk from cows, buffaloes, ewes and goats.
* refers to countries in the Mediterranean area

Table 3. The world's leading countries in milk producing ewes and goats combined populations (>100,000 t milk in 1993) (FAO, 1994)

	Ewes + goats mill.	People mill.	Ewes goats per person	+Pasture permanent mill. ha	Ewes + goats per permanent pasture ha
China	208	1,206	0.2	400	0.5
India	163	896	0.2	11	14.8
USSR	140	290	0.5	324	0.4
Iran	69	63	1.1	44	1.6
Pakistan					
Turkey*	68	128	0.5	5	13.6
Sudan	49	60	0.8	12	4.1
Brazil	38	27	1.4	110	0.3
Spain*	32	157	0.2	187	0.2
Bangladesh	28	39	0.7	10	2.8
Algeria*	27	122	0.2	<1	45.0
Somalia	21	27	0.8	31	0.7
Indonesia	18	10	1.8	43	0.4
Mexico	18	195	0.1	12	1.5
Syria*	17	90	0.2	74	0.2
Greece*	17	14	1.2	8	2.1
Afghanistan	16	10	1.6	5	3.2
Mali	16	20	0.8	30	0.5
Romania*	14	10	1.4	30	0.5
Italy*	13	23	0.6	5	2.6
France*	11	58	0.2	5	2.2
Iraq	11	58	0.2	11	1.0
Yugoslavia*	8	20	0.4	4	2.0
Bulgaria*	7	24	0.3	6	1.2
Mediterranean area*	6	9	0.7	2	3.0
World	179	322	0.6	95	1.9

Table 4. Importance of ewes and goat milk to human nutrition in countries leading in their production (>100,000 tons in 1993) (FAO, 1991,1994)

	Ewes goat's milk 1,000 tons	+Ewes goat's milk in % of country (1)	+ milkAll person/year (1) kg	milk/animal products/ person/ day	Food supply all animal products/ person/ day
				Protein g	Calcium mg
Algeria*	365	36.0	38	19	416
Somalia	575	76.2	76	31	796
Greece*	1,080	60.8	178	57	683
Bangladesh	1,015	56.2	15	5	43
Iraq	245	46.2	26	-	-
Iran	1,707	46.0	59	-	-
Afghanistan	240	44.4	27	-	-
Syria*	579	42.0	99	19	337
Indonesia	259	40.5	3	9	54
Algeria*	365	36.0	38	19	416
Sudan	1,070	30.0	132	20	438
Bulgaria*	218	13.8	176	52	604
Turkey*	1,354	13.2	171	18	206
Romania*	434	13.0	145	43	522
Spain*	705	10.8	167	59	529
China	808	10.0	7	12	40
Italy*	805	7.2	194	57	604

France*	1,517	5.7	457	76	966
Pakistan	646	3.8	134	15	337
India	2,220	3.5	70	8	195
Yugoslavia*	134	3.0	185	40	511
Mexico	136	1.8	84	31	303
Brazil	140	0.9	101	24	297
USSR	350	0.3	349	56	567
Mediterranean area*	7,191	10.6	211	44	538
World	18,060	3.5	93	25	255

(1) Includes all milk from cows, buffaloes, ewes and goats.

* refers to countries in the Mediterranean area

Table 5. Average composition of milk (100 g) of 4 species (Posati & Orr, 1976)

	Ewes	Goats	Cows	Human
Solids, total, %	19.30	12.97	12.01	12.50
Energy, kcal	108	69	61	70
KJ	451	288	257	291
Protein, total, %	5.98	3.56	3.29	1.03
Lipids, total, %	7.00	4.14	3.34	4.38
Carbohydrates, %	5.36	4.45	4.66	6.89
Ash, %	0.96	0.82	0.72	0.20
Ca, mg	193	134	119	32
Fe, mg	0.10	0.05	0.05	0.03
Mg, mg	18	14	13	3
P, mg	158	111	93	14
K, mg	136	204	152	51
Na, mg	44	50	49	17
Zn, mg	-	0.30	0.38	0.17
Ascorbic acid, mg	4.16	1.29	0.94	5.00
Thiamin, mg	0.065	0.048	0.038	0.014
Riboflavin, mg	0.355	0.138	0.162	0.036
Niacin, mg	0.417	0.277	0.084	0.177
Pantothenic acid, mg	0.407	0.310	0.314	0.223
Vitamin B6, mg	-	0.046	0.042	0.011
Folacin, mcg	-	1	5	5
Vitamin B12, mcg	0.711	0.065	0.357	0.045
Vitamin A, RE IU	42	56	31	64
Saturated FA, g	147	185	126	241
C4:0, g	4.60	2.67	2.08	2.01
C6:0, g	0.20	0.13	0.11	-
C8:0, g	0.14	0.09	0.06	-
C10:0, g	0.14	0.10	0.04	-
C12:0, g	0.40	0.26	0.08	0.06
C14:0, g	0.24	0.12	0.09	0.26
C14:0, g	0.66	0.32	0.34	0.32
MCT total (C6-C14),g	1.58	0.89	0.61	0.64
C16:0, g	1.62	0.91	0.88	0.92
C18:0, g	0.90	0.44	0.40	0.29
Monounsatur. FA, g	1.72	1.11	0.96	1.66
C16:1, g	0.13	0.08	0.08	0.13
C18:1, g	1.56	0.98	0.84	1.48
C20:1, g	-	-	trace	0.04
C22:1, g	-	-	trace	trace
Polyunsatur. FA, g	0.31	0.15	0.12	0.50
C18:2, g	0.18	0.11	0.08	0.37
C18:3, g	0.13	0.04	0.05	0.05
C18:4, g	-	-	trace	-
C20:4, g	-	-	trace	0.03
C20:5, g	-	-	trace	trace
C22:5, g	-	-	trace	trace
C22:6, g	-	-	trace	trace
Cholesterol, mg	-	11	14	14

Phytosterol, mg	-	-	trace	-
Tryptophan, g	0.084	0.044	0.046	0.017
Threonine, g	0.268	0.163	0.149	0.046
Isoleucine, g	0.338	0.207	0.199	0.056
Leucine, g	0.587	0.314	0.322	0.095
Arginine, g	0.198	0.119	0.119	0.043
Histidine, g	0.167	0.089	0.089	0.023
Alanine, g	0.269	0.118	0.113	0.036
Aspartic acid, g	0.328	0.210	0.250	0.082
Glutamic acid, g	1.019	0.626	0.689	0.168
Glycine, g	0.041	0.050	0.070	0.026
Proline, g	-	0.368	0.319	0.082
Serine, g	0.492	0.181	0.179	0.043

Table 6. Relative composition of ewes and goat milk in relation to the composition of human milk = 100% (Posati & Orr, 1976)

	Ewes	Goats	Cows
Solids, total	154	104	96
Energy	154	99	87
Protein	580	346	319
Fat	160	94	76
Lactose	78	64	68
Minerals	480	410	360
Ca	603	419	372
Fe	333	167	167
Mg	600	467	433
P	1128	793	664
K	267	400	298
Na	259	294	288
Zn	?	176	224
Ascorbic acid	83	26	19
Thiamin	464	343	271
Riboflavin	986	383	450
Niacin	236	156	474
Pantothenic acid	182	139	141
Vitamin B6	?	418	382
Folacin	?	20	100
Vitamin B12	1580	144	793
Vitamin A	65	88	48
Saturated fatty acids	229	133	103
C4:0 butyric	2000	1300	1100
C6:0 caproic	1400	900	600
C8:0 caprylic	1400	1000	400
C10:0 capric	667	433	133
C12:0 lauric	92	46	35
C14:0 myristic	206	100	106
C16:0 palmitic	176	99	96
C18:0 stearic	310	152	138
Monounsaturated FA	104	67	58
C16:1 palmitoleic	100	62	62
C18:1 oleic	105	66	57
Polyunsaturated FA	62	30	24
C18:2 linoleic	49	30	22
C18:3 linolenic	260	80	100
MCT-FA C6:0 - C12:0	288	178	84
Cholesterol	?	79	100
Tryptophan	494	259	270
Threonine	583	354	324
Isoleucine	604	370	355
Leucine	618	330	339
Lysine	754	426	384
Methionine	738	381	395
Cystine	184	242	158
Phenylalanine	617	337	346
Tyrosine	530	338	300

Valine	711	381	349
Arginine	460	277	277
Histidine	726	387	387
Alanine	747	328	314
Aspartic acid	400	256	305
Glutamic acid	606	373	410
Glycine	158	192	269
Proline	?	449	389
Serine	1144	421	416

Table 7. Mean allelic frequency of polymorphisms of alpha-s-1-casein in European dairy goat breeds (J. Jordana et al., 1995)

Polymorphic type	A	B	C	E	F	D+O
Murciana-Granadina (109)	0.08	0.23	-	0.59	0.08	0.02
Malaguena (373)	0.09	0.09	-	0.65	0.04	0.13
Payoya (111)	0.05	0.19	-	0.76	-	-
Canaria (74)	0.28	0.32	-	0.20	-	0.20
Palmera (22)	0.68	0.23	-	0.09	-	-
Majorera (21)	0.07	0.38	-	0.24	-	0.31
Tinerfena (31)	0.15	0.35	-	0.32	-	0.18
Alpine - France (213)	0.14	0.05	0.01	0.34	0.41	0.05
Alpine - Italy (80)	-	-	-	0.35	0.59	0.06
Saanen - France (159)	0.07	0.06	-	0.41	0.43	0.03
Saanen - Italy (70)	0.03	0.03	-	0.49	0.46	-
Poitevine (209)	0.05	0.35	-	0.45	0.14	-
Corse (106)	0.06	0.13	-	0.14	0.59	0.08
Rove (147)	0.12	0.05	-	0.62	0.10	0.11
Garganica (54)	0.61	0.37	-	0.02	-	-
Maltese (81)	0.33	0.28	-	0.11	0.27	0.01

Table 8. Changes in physico-chemical properties of Kopanisti cheese during ripening (Anifantakis, 1991)

	Days of ripening				
	1	8	16	32	46
Moisture, %	53.5	52.8	52.5	52.3	52.1
Fat, %	22.0	22.3	22.5	22.5	22.7
Proteins, %	17.8	18.2	18.7	19.0	19.3
Casein, %	16.5	16.1	15.5	14.3	13.6
Soluble N, % of total N	7.4	11.7	16.5	24.2	28.9
Non-protein N, % of total N	3.9	8.6	13.3	20.4	24.6
Amino acid N, % of total N	0.7	0.9	1.2	3.6	6.6
Free amino acids, mg/g non-fat DM	48.4	136.8	209.3	355.9	421.1
Free fatty acids, g/kg cheese	2.3	5.7	11.9	29.9	50.2
Acid degree value	2.9	8.2	20.1	57.1	95.6
pH	4.9	4.8	4.6	4.7	4.8

Table 9. Milk intake from 4 alternative sources compared with recommended human daily dietary allowances (RDA) (Gebhardt & Matthews, 1991; NRC, 1968)

	1 cup (245 g) milk intake contains				RDA
	Human	Cows	Goat	Ewes	
Tryptophan, g	0.041	0.113	0.106	0.207	0.5
Threonine, g	0.112	0.362	0.398	0.657	1.0
Isoleucine, g	0.137	0.486	0.505	0.829	1.4
Leucine, g	0.233	0.786	0.765	1.438	2.2

Lysine, g	0.168	0.637	0.708	1.256	1.6
Methionine, g	0.052	0.201	0.196	0.379	2.2
Cystine, g	0.047	0.074	0.113	0.085	?
Phenylalanine, g	0.113	0.388	0.377	0.696	2.2
Tyrosine, g	0.129	0.388	0.437	0.689	?
Valine, g	0.156	0.537	0.585	1.098	1.6
Ca, mg	79	291	326	474	800
Mg, mg	8	33	34	45	200
P, mg	34	228	270	387	800
K, mg	126	370	499	334	?
Thiamine, mg	0.034	0.093	0.117	0.159	0.8
Riboflavin, mg	0.089	0.395	0.337	0.870	0.9
Niacin, mg	0.435	0.205	0.676	1.022	14
C18:2 linoleic acid, g	0.92	0.18	0.26	0.44	?
C18:3 linolenic acid, g	0.13	0.12	0.10	0.31	?
C20:4 arachidonic acid, g	0.06	-	-	-	?

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Pumpkin patch at The Lavender Fleece.

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Diversify your Sheep Farm: Grow Pumpkins in Barn Waste

Laurie Ball-Gisch

When we moved to our farm six years ago, my husband wanted to plant pumpkins - great big gigantic pumpkins for our young daughters to enjoy at Halloween. And he had a dream that one day he and the girls would set up a pumpkin stand in our front yard or go to the local farmers' market and sell pumpkins each autumn. So every spring Daryl dutifully set out pumpkin seeds. And each summer, to his disappointment, a few, small pumpkins would grow. The soil here is quite sandy, was sadly depleted, and just would not grow pumpkins.

At the same time, I was realizing my dream of having an Icelandic sheep farm and we were busy building our farm business around the sheep and wool. As all sheep farmers know, part of sheep raising also means lots of barn and barnyard cleanup. I tease my husband that our exercise program is hauling out the straw and hay, mixed with manure - wheel barrow full by wheel barrow full (we don't have a tractor or manure spreader on our small farm). Over the seasons, we would dump wheel barrow shaped mounds of this sheep manure/hay/straw mixture in rows surrounding the perimeter of the barn and other outbuildings.

Daryl would till this manure each spring into the soil behind the barn, hoping one day he'd be able to enrich the soil enough that it would grow his beloved pumpkins. Whenever he would start his pumpkins, as well as squash, tomatoes and other vegetables, soon the weeds would take over and he would be lucky to find anything in his "jungle garden" by the end of summer. He began to despair of ever growing any pumpkins here.

So each October we would take our children to the local pumpkin farm, a mile up the road, to pick out their jack-o-lanterns. And I would eagerly wait for the annual "truckload" sale of pumpkins starting the day after Halloween. For \$10, I can haul home a truck or trailer load of pumpkins, which I feed to the sheep over the next weeks. Pumpkins are great food for sheep and they love to eat them. The seeds are said to have an effect on parasites by helping eliminate worms from the stomach as the seeds are digested and passed on through the system. Native Americans used pumpkin to cure kidney infections and rid the body of worms and the leaves of the pumpkins may be crushed and rubbed on livestock as a fly repellent (Damerow, p153). The pumpkin, like squash (which are technically fruits), are high in beta carotene (Vitamin A). If I toss out whole pumpkins that are ripe or even overripe, the sheep are able to stomp and open the pumpkins themselves, in order to eat the inside seeds and pulp. If a pumpkin is still hard, I take an ax to it to break it in half so it is more accessible to the sheep.

This past spring, as I surveyed our farm, I realized we had some interesting mounds that had not yet been tilled into the soil. Over time the straw/manure breaks down, albeit quite slowly, so we had these long, fairly high mounds of composting straw/manure surrounding the farm. Daryl had saved seeds from several kinds of pumpkins we purchased last fall and so he had several hundred "free" seeds dried and ready to plant. I suggested that he plant the seeds directly into the straw/manure piles, without tilling the ground. He was hesitant, but since he had so many seeds, he thought "why not?" So all around the farm he and the girls went in mid-May pushing pumpkin seeds into the mounds and mounds and mounds of manure that was redefining our farm's landscape.

It was quite evident soon afterward that the seeds were germinating well. And indeed, the seeds thrived in - and in fact, exploded - into a riot of pumpkins. And best of all, no weeds grew in this straw mix! Only the pumpkins!

We now have pumpkin vines making a lovely green backdrop all around the farm. Some of the pumpkins are huge - already by early September there are some varieties that are 3-4 feet across. There are some pumpkins that have already turned orange and are ready to feed out to the sheep now. No matter to us that it's a month early for Halloween - the already ripe pumpkins can be fed to the sheep at anytime. Sheep waste, in the form of these manure/straw piles is a wonderful medium for growing pumpkins. We have hundreds of pumpkins now, when before, we were never able to grow more than a half dozen. Our farmscape is a riot of green and orange and it has beautifully filled in otherwise ugly, unused spaces of our farm.

Because our girls are too young yet to work at a farmers' market assisting their dad, we will hold off on advertising and selling pumpkins. But the pumpkins make a great food stuff for the sheep; the girls can pick their favorites for their jack-o-lanterns, and by saving seeds from the best specimens, we can repeat the pumpkin "experiment" again next year.

I anticipate that at some point in the next few years Daryl will finally be able to set up his pumpkin stand with his daughters and realize his dream of being a pumpkin farmer. And now when I ask him if he can clean out the barn, he has visions of large pumpkins to spur him on!

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Don't Neglect Those Feet and Hooves

Marty Favre

This has been an extremely wet year for us in mid-Michigan. We have always known that it is important to enable sheep to have a dry place to seek shelter. Unfortunately, the constant rain of last fall, plus a mistake in the placement of two of our shelters made it impossible to insure dry quarters. Suddenly, in mid-December, we had a limping wether. We had never had limping sheep before, so we figured this was the result of a rough encounter with the ram he was companion to. However, the next day, the ram also started limping! This was the beginning of a two month exercise in maintaining our determination to restore our flock to full hoof health and learning a new spectrum of skills to keep our sheep healthy. I would like to share what we have learned.

Panic is the only word to describe the feeling that comes of being told by your vet that your sheep have foot rot! We would have been spared a lot of worry if we had a sheep vet instead of a very nice bovine/camelid vet who knows a lot of general things about ruminants, but not much specific about sheep. He is learning. Our vet told me that we had foot rot. According to him, you can tell by the black line between the hoof wall and the soft part of the foot. Naturally, I went to my beginner sheep keeping books and, sure enough, they talked about foot scald and contagious foot rot. There was only a vague reference to other foot problems. Since it wasn't scald, and since our vet said it was foot rot, we figured we must have foot rot.

We could identify two possible sources of the bacteria that causes contagious foot rot. One was having taken sheep to the Michigan Fiber Festival. The other was the shearer. We decided that the Fiber Festival couldn't have been the source, because the problem first emerged with sheep that hadn't gone. We then blamed the shearer for quite a while until it became clear that we didn't have the contagious kind.

A timely newsletter from Pipestone Veterinary Supply referred to a hoof problem they were having with "white line disease". Since I had also seen white lines in the sheep hooves, as well as the black ones referred to by my vet, I decided I needed to know more. An on-line search took me to a website: www.organicvet.reading.ac.uk/Sheepweb/disease/lame/lame.htm

This website referred to Foot rot and Scald as the main causes of lameness, but also stated that there are many more. One of these is described as "White Line Separation". The website says, "The white line is the site at which the horn of the wall of the hoof joins that of the sole. It is a naturally weak area in the horn and there are two problems that can occur here, both eventually leading to lameness. The first problem occurs when a toe abscess develops along the white line. Pus forms and the animal becomes acutely lame. Some animals suffer repeated attacks, probably due to a permanent defect in the horn."

"The second problem is a more extensive degeneration of the white line. This is called shelly hoof, and is characterized by pockets, impacted with dirt and other debris, where the hoof wall has become separated. Mild cases, not necessarily leading to lameness, are very common. More severe cases get abscesses and become lame (Scott and Henderson, 1990; Winter, 1998)."

What a relief to find that our problem wasn't as seemingly impossible to overcome as we had thought! We isolated the sheep with problem feet, trimmed and trimmed and trimmed, and medicated from the inside with LA 200 (two doses, three days apart) and on the outside with Koppertox. (We used Koppertox instead of a footbath because it was January. We painted on the Koppertox and kept the sheep inside on dry bedding until their feet dried so we wouldn't get frozen feet.)

These are the steps we are implementing to prevent this from ever happening again: First, we trim our hooves more often. We had been told by an old experienced sheepman/shearer that twice a year was plenty. That may work if you are sending your sheep to market or if you have rocky places for your sheep to walk. We still aren't trimming as often as I would like, but finding enough time is definitely an issue. We are trimming about 4 times a year, now. We also are reworking our facilities. One of the things we plan to have on hand in the future is a supply of rough concrete paving stones. If we had placed pavers on the muddy paths that the sheep made going to and from their shelter, they would have not only kept mud out of their feet, but they would have been self-trimming their own feet to a certain extent.

When we trim hooves, now, we have learned of two essential tools. One is the need for a hoof knife; the other is a sheep deck chair.

For those of you who haven't seen one, a hoof knife is about the size of a paring knife, but has a curved tip. This curve, though hard to sharpen, is the best way to carve away at awkward and suspicious places on sheep feet. The two surfaces that face each other on a hoof can easily become distorted or cracked. If you have any suspicion that there could be a pocket in the hoof material, it will save time, aggravation, pain for your sheep, and money for you if you will pare away at the suspicious area to smooth it out. If you have a problem hoof, you may even have to pare until you get to fairly raw flesh. It is important to follow any veins of dirt, manure, or deteriorating hoof with your knife until you get to completely sound flesh or hoof. If you are patient, it can be done without causing a lot of pain to your sheep (although they will definitely be annoyed at you). An easily found product called Koppertox (used to treat thrush in horses) can be painted on the hoof to kill bacteria. (I tried dipping the feet for a while. I found that kicking sheep splashed too much. Painting is less wasteful and much less messy.)

The other benefit of the hoof knife is that you can use the long blade to carve away thin slices of the soft heel. A well trimmed sheep foot is level across the back and has even tips. Also, ideally, the bottom will parallel the growth rings that you can see on the hoof. I never realized there were growth rings until last winter. Before, when we trimmed, it was based on trimming away folded under hoof material and making the toes shorter. I am still working to restore my older sheep to better hoof shape. The ISBONA Newsletter, Winter 2003, has a very good illustration of hoof anatomy. It doesn't have a good list of tools, though. Hoof shears and a hoof knife are essential. A small jar with an inch or so of Koppertox in it (to limit loss and mess if your sheep happen to knock over your jar) and a small paintbrush to paint Koppertox onto suspicious places are extremely valuable.

If you are trimming a sheep's hooves because it was limping, it would be a good idea to give it an injection of LA 200 and paint the hoof with Koppertox. This treats possible foot infections inside and out.

The sheep deck chair seemed like a luxury when I first saw one in a catalog. However, I am completely inept when it comes to sitting a sheep up on its end. We tried haltering the sheep and having David (try to) hold them still while I did the trimming. A sheep on three legs has a lot of wiggle and many kicks. We could manage the gross trimming, but the careful trimming to do a good job and to expose pockets that might harbor infection was impossible. We bought a deck chair and what a difference! I can usually trim our ewes and lambs when David is at work. (I still need

help with the rams.) An added benefit to having the deck chair was that it made tattooing and tagging the lambs much easier this year.

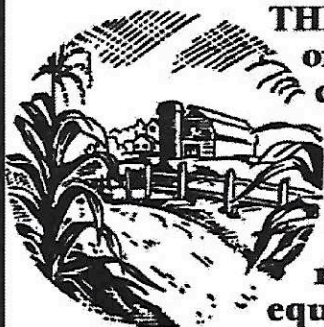
Finally, I read Laura Lawson's booklet, *Hoof Care*, LDF Publications, 1993. It gives a very clear description of how to trim a hoof. More importantly, it presents a compelling argument for the need to supplement your sheep's diet with zinc methionine. According to the booklet, your sheep mineral may list zinc as a component. However, only zinc methionine remains available for direct absorption when used as a dietary supplement. Zinpro 40 is recommended as a product that contains zinc methionine. It is listed as being available from "pbs Livestock Health" at 1-800-321-0235. Apparently, from this source it comes in 50 pound bags at \$75.00 each. (p. 17) I ordered mine through Useful Lama Items (1-800-635-5262 or www.usefullamaitems.com). It is sold in 1 pound increments at \$1.80 per pound. Laura Lawson recommends feeding this product at the rate of 1 gram per head per day or 1 ounce per 28 head sheep per day. (p. 16)

(If treating foot rot, don't use LA 200 while supplementing with zinc. According to the booklet, tetracycline (such as LA 200), oxytetracycline (Terramycin), and chlortetracycline (aureomycin) interact with zinc. Zinc can reduce the absorption of the antibiotic and the antibiotic can reduce the absorption of the zinc. (p. 23)

I hope sharing my problem and the solutions we found will help other new shepherds avoid the panic that hit our farm last winter. Prevention is definitely easier than the cure!

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Oregon Flock & Fiber Festival

ISBONA Annual Meeting & Show

The 8th annual General Meeting (AGM) of the Icelandic Sheep Breeder's of North America (ISBONA) was held on Saturday, September 25 in conjunction with the Oregon Flock and Fiber Festival (OFFF) in Canby, Oregon. The Icelandic Sheep were the featured breed of the event. The Icelandic sheep and sheep breeders were well represented there, with the largest group of Icelandic sheep ever gathered for exhibition so far. Over 30 sheep were entered in the show held on Sunday.

The AGM was held on Saturday evening and was attended by a wonderful group of Icelandic breeders. It was a great pleasure to meet many western friends in person. Nina Dent put together a fun event for all of us gathered for the meal and meeting. Many thanks to Susan Chapell, Karol Rich, Melissa Liebe, Lilly Leveque, and to all the members that were present. The silent auction was once again filled with a wide array of items donated by our generous members. Many thanks to Raylene for her donation of the ram lamb.

The business meeting was followed by discussions of some ideas to utilize the money raised by ISBONA. Having a "grant" type program that could offer small amounts to members for the purpose of educating folks about the sheep at local events, sponsoring show awards were among ideas presented. The ideas will be brought back the board and general membership for discussion also, as there was not a quorum of members present. "Bring sheep home" was another topic and the ever present threat of the increasingly resistant parasites faced by sheep was also discussed. Some ideas for the next AGM, celebrating the 20th anniversary of the Icelandic Sheep in North America, were also offered.

The highlight of the weekend was the Icelandic Sheep show on Sunday morning. Our members that made the effort to bring their sheep deserve many thanks. It was an impressive group of sheep. The many displays of the sheep were not only educational but also very eye-catching and crowd pleasers. There were several farms represented: Bella Vista Farm (Peggy and James Nelson), Sunnyside Farm (Susan and Paul Chappell), Walker Forks Sheep Camp (Helen McFarland) all from California; Hawks Mountain Ranch (Lisa Roskopf and George DeGeer) from Oregon; from Washington: Trumpkinland Farm (Fran Ogren) and from Montana, Leveque Ranch (Dale & Lillian Leveque) and Hole in the Fence Farm.

This is a fiber event and the judge for the show was Doug Montgomery who is a shepherd himself. He raises Jacobs and Navaho Churro, is a graduate of the Glen Eidman Wool Judging School, and a Registration inspector for the Jacob breed. The judging is based on 60% the fiber and 40% on

the conformation of the animals in this show. Listed below are the classes and the standings. Special congratulations are due to Leveque Ranch for the Reserve Champion Ram and Hawks Mountain Ranch for the Reserve Champion Ewe in the Classic Breed Division featuring Jacobs, Navaho Churro, Shetlands and Icelandics.

In the Icelandic show, the results of the judging were:

Yearling Ram

- 1st & Reserve Champion, Leveque Ranch
- 2nd Hole in the Fence Farm

Ram Lamb

- 1st & Champion Ram, Leveque Ranch
- 2nd Walker Forks Sheep Camp
- 3rd Hawks Mountain Ranch
- 4th Leveque Ranch
- 5th Bella Vista Farm

Yearling Ewes

- 1st & Reserve Champion, Ewe Leveque Ranch
- 2nd Bella Vista Farm
- 3rd Bella Vista Farm
- 4th Leveque Ranch

Ewe Lambs

- 1st & Champion Ewe, Hawks Mountain Ranch
- 2nd Walker Forks Sheep Camp
- 3rd Leveque Ranch
- 4th Hawks Mountain Ranch
- 5th Bella Vista Farm

Best Young Flock (3 animals)

- 1st Hawks Mountain Ranch
- 2nd Leveque Ranch
- 3rd Walker Forks Sheep Camp
- 4th Trumpkinland Farm
- 5th Bella Vista Farm

Best Fleece Judges Choice Award in Classic Division (a very special award for the best fleece of the 4 breeds represented): Hawks Mountain Ranch

The show was well attended and there were as many as 10 Icelandics in some classes. Just about all the colors and patterns were represented.

Curryheen Farm, Brendan Enright from Oregon, was to exhibit also as well as have a vendor booth, but his son, the hockey player, had a "puck incident" the night before and was home with the animals. We all should be very proud of the showing made by our Icelandic group, it was very impressive. ■

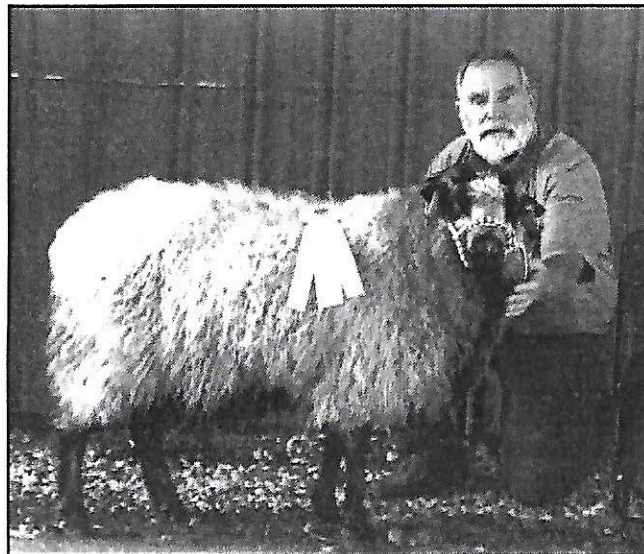


Levesque Ranch – Champion Ram Lamb



Michigan Fiber Festival

The Michigan Fiber Festival opened at Allegan, Michigan on August 21 & 22, 2004, to perfect weather and over 100 fiber vendors. Large crowds were on hand both days, purchasing items from the varied offerings for knitting, weaving, and felting. In the Icelandic breed there were 4 breeders entering 45 sheep for show and sale. Serving as judge was Matt Shane of Adrian, Michigan. The results of the show were as follows:



Yearling Ram

- 1st place: Lyle and Donna Behl
- 2nd place: Marty and David Favre
- 3rd place: Lyle and Donna Behl

Junior Ram Lamb

- 1st place: Lyle and Donna Behl
- 2nd place: Lyle and Donna Behl
- 3rd place: Marty and David Favre
- 4th place: Nikki Riedel

Champion Ram and Supreme Champion Ram

Lyle and Donna Behl

Reserve Champion Ram

Marty and David Favre

Yearling Ewe

- 1st place: Lyle and Donna Behl
- 2nd place: Lyle and Donna Behl
- 3RD place: Nikki Riedel
- 4th place: Nikki Riedel

Junior Ewe Lamb

- 1st place: Nikki Riedel
- 2nd place: Lyle and Donna Behl
- 3rd place: Lyle and Donna Behl
- 4th place: Marty and David Favre

Champion Ewe

Lyle and Donna Behl

Reserve Champion Ewe

Nikki Riedel



A Story With a Little Hope

Brittany LeVeque

My lamb's name is Hope. She is a black Icelandic lamb with some brown sun bleached spots on her head, and small horns. She was born on 4/23/04. Her mother's name is Ruby and she is owned by my little brother, Ethan. Coalie, her father belongs to my mother. So really Hope doesn't belong to me one bit. Any way Hope also has a twin sister which is unnamed.

When the lambs were born we had to decide which one we would take as a bum. Ruby could not feed both lambs as she only has 1/2 a bag. We picked one and named her Hope. We named it Hope because we hoped it wouldn't die or because we hoped it would grow big and healthy.

When we took Hope off of her mother we tried to put her on a ewe with a single lamb and a large bag. The new mother would not take Hope, so we tried to give Hope back to her real mom but Ruby didn't want Hope back. I then started bottle feeding her.

I fed her every morning and night and when I had school, Mom fed her in the afternoon. Some weeks later Hope got ill. My Mother being so good with sheep and all gave her a bath and some medicine and she thankfully got better. She became one of the family's best friends.

Eventually she got older and we took her off of the bottle and now she eats, drinks, and sleeps with the other sheep.

Sadly Hope died two weeks before fair. It was very hot and she was in the sun unable to get up. This happened after I had wrote this story.

Brittany is a freshman at Cascade High School in Montana. She enjoys all of the animals. She took Suffolk lambs to the fair for market lambs as our fair is in July, Icelandics are hard to get to the 100lb minimum for market lambs in July and market lambs are to be shown shorn.

Notes from Wales

Jill Tyrer

It is like late Autumn here in Wales at present. I have 2 fields of hay waiting for a week of dry weather. If I don't get that in, then I'll only have a small barn full of a mix of several seasons' hay for this winter. Very worrying. Apparently the forecast is for some dry weather during September, so fingers crossed.

Life has been a bit hectic here for the past few months. Lambing wasn't due to start until the beginning of July - I like to lamb the flock late to avoid all the bugs flying around in the mass lambings taking place in this area during March and April. But, horror, I was presented with 6 black (at least 3 now grey) lambs and one moorit within two days at the end of April. Despite the number of years I have bred sheep, I had no idea that 4 ewes, still with last years lambs, were expecting!

The culprits were the small ram lambs born in July 2003 that I had left with their mums to over winter. They were so small going into the winter months that I had decided to leave them together to ensure the lambs survived the bad weather.

Lesson - ram lambs born late in the year mature earlier!

At 4.5 months old they had mated the four mums.

I have to say the resulting offspring are growing very quickly, and look good. But there is now an awful lot of meat to go in our freezer before this winter!

Following on from this; people talk about the Thoka gene, but it has never been brought into the UK. It is a rare gene. Far more important, and something that few people promote about Icelandic sheep, is that, because some of them have a long cycling season (no giggling, please), they can lamb naturally i.e without being sponged, any time from February to September. I suppose it would be possible for them to even lamb twice a year, but more likely three times in two years. Very useful for meat and milk producers.

Another point to remember is that if they are lambing late the gestation period is only usually around 138 days. Something to do with daylight hours maybe?

The April born ram lambs have been weaned & are in with last years boys now. Er, their Dads, that is. The July born lambs are suffering with this weather though. Plenty of grass, but not so much goodness in it at this time of year, so I am having to provide a lot of supplementary feed to try & put some weight on them quickly. With the way the seasons are changing I think I'll have to go for May/June lambings next year. These poor lambs are also being plagued by blowflies, and several are suffering from strike wounds now. Something I would never expect to happen at this time of year.

Several months ago we took 2 x 2+ year old rams for slaughter. The resulting mutton was absolutely superb . More like beef in taste. We took 2 x 4 year olds recently, and again the mutton is superb. All the rams were high % Icelandic crossbred. With the second two, we were worried about the possibility of taint, as we had tasted someone else's mutton pies that had a definite taint - they call it strong flavour. So we asked a specialist butcher who deals with rare breed meats. She, yes she, told us to make sure the carcass hung for 3 weeks after slaughter, if this wasn't possible, then to cut the carcass up immediately after slaughter to avoid the musky oils seeping into the meat. Our local butcher was prepared to hang the carcasses in his coolroom for the 3 week period. So we took them to the butcher with several weeks gap between the two. When we collected the first one Dan had to cut all the meat off the bones as it was going to take up too much room in our freezer. He cut the meat into small pieces for winter stews, plus he made a few trial sausages (he used to make lots of sausages in the early days of our smallholding life - became quite a professional! - taught by the butcher's suppliers at the old Liverpool abattoir). The mutton sausages were so nice that we bought a new stainless steel sausage stuffer (the old one is cast iron), and the second carcass was turned totally into various types of sausage. So, whereas before it was "oh, no, 6 out of 7 lambs born are male", now it is "oh, lovely, more sausages"!

Do you know that the EU have agreed that any sheep that is born and bred in Wales is entitled to be called a Welsh Sheep now?! So I could sell my Icelandic legs of lamb as Welsh lamb. Bit of a difference in taste though!

I really look forward to receiving my ISBONA Newsletter. Sometimes, courtesy of the British postal system, I even receive my copy before most of you. The article about culling in the last Newsletter really incensed me, but the way Laurie placed the next article about the genetic diversity of Icelandic sheep as a follow on was absolutely superb. Like Angie, I believe that the character of the Icelandic sheep should be left untouched. Or at least if one person wants to prove they can be short legged, meaty animals, this should not be pushed down everyone else's throats. Sorry Gary. I could say that as the Icelandic is a hill breed, it is essential that it has long legs and a lean frame to help it survive in such a terrain. But that does not mean that such an animal cannot also be a meat animal. We used to keep Bernese Mountain dogs, but they had been changed so much from the original Swiss mountain herding dog that the legs could no longer cope with the heavy frame, and their life span had been drastically reduced. We were lucky that our two survived to 8 and 5 years old. We have never been able to replace the big hole that they left in our lives. I love traditional Icelandic sheep, not some improved sub species that won't live so long.

The British Icelandic Sheep Breeders Group had its biennial AGM in July. In 2002 only 2 of us turned up. This year we were delighted when a local member increased our number to 3. It was a 7 hour round trip for Dan and I to attend this AGM. Was it worth it? I reserve judgment.

We actually have about 27 members now, but only about 16 of these have breeding flocks. Although the British Isles is tiny in comparison to North America, the flocks are very widespread, which means that communication is mainly via the Newsletter I produce. Just like Laurie I find it difficult to persuade members to contribute articles. It is very tiring trying to produce a Newsletter that you hope will be of interest to members, but you never know if it is because they never tell you! Anyone fancy doing a few articles for me??

I really do enjoy being part of the ISBONA egroup. The recent discussion on felting was fascinating, and I sat and watched the 'video' on making a felt hat on one of the recommended websites. I do hope there are some articles about this in the Newsletter.

Oh well, time's up. Back to seeking out yukky maggots now.

Best Wishes from Jill Tyrer and Cae'rddraig Icelandic Sheep in North Wales, UK. ■

Photo courtesy of The Lavender Fleece



Isfaxes Farm: Icelandic Sheep and Horses

Bonnie Swenson

Our destiny to own Icelandic sheep began long before we were aware of it. My husband, Peder, grew up spending his summers (and some winters) in Iceland at his older sister's sheep ranch in the Northwest of Iceland, helping with lambing, sheep round-up, and getting to know the traditional customs and culinary delicacies. He spent much of his life around horses, specifically Icelandic horses. The family started an Icelandic Horse business in the early 1990's, and Peder became a horse trainer, attending programs in Iceland, Canada, and the US.

I grew up with a few cats and some chickens in the back yard in southern California. My experience with farm animals was limited to my experiences photographing them. I began photographing horses when I was sixteen. Some of my photos were used as advertising and some were published in horse magazines beginning in 1997. My experiences with horses expanded as I got to know my (now) husband.

When we were married in 2002 we started a "normal" life in southern Oregon - no farm animals in sight. That changed almost immediately. We moved to Goldendale, Washington to manage the family horse ranch for a winter. The work was hard and seemed never-ending, but the experience of working with the horses was rewarding. A winter turned into a year, and in the meantime, I fell in love with Icelandic horses. Well, one horse in particular, but that's a different story.

The ranch spread over 640 acres of rolling alfalfa fields, ponds, and riding trails. While Peder trained horses, my free time at the ranch was spent following the herd of about 100 horses and taking photos. As more and more trainers came to stay on the ranch, I improved my riding skills, and spent most of my time assisting the trainers and riding my new mare (that horse I fell in love with).

On this same horse ranch, the owner had a small flock of Icelandic sheep that she bought on a whim, but never ended up doing anything with. It fell upon Peder and me to care for them. What Peder never expected was that I would fall head over heels for the sheep. It happened over time, but the moment that I realized I was in love was when I sat in their paddock one spring evening at feeding time. It had been a tough day for me, and I needed some time alone. The sun was going down, and this is when all the lambs play the most (while the moms are busy eating). The little lambs were discovering how fun it was to play with each other, jumping and play-fighting. Everything was exciting to them, and every other lamb was their best friend. Their innocent joy just made everything else in my life melt away. They were my escape.

Shortly after Peder and I moved off the ranch to continue our "normal" life, the owner of the horse farm decided to



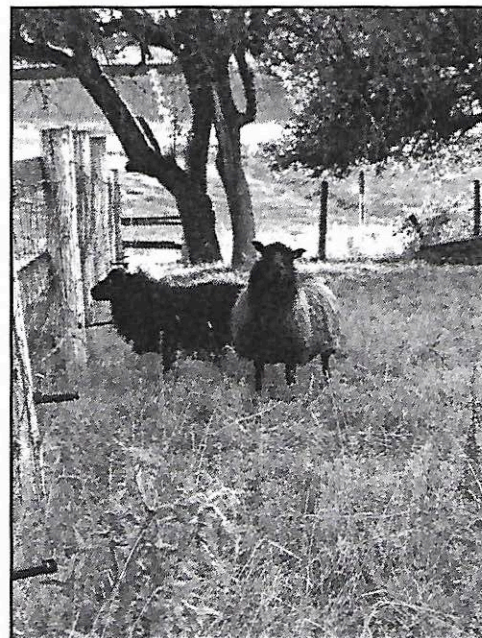
get rid of the sheep. Learning that the sheep would be sent to auction, I decided we had to buy them. We moved to the West side of the Cascade Mountains with our sheep and our horses, and Isfaxes was born

I spent the next few months obsessed with researching sheep care and flock management styles. Careful feeding and record keeping, and a great love for the sheep led to a noticeable improvement in condition score, followed by a fantastic lambing season in 2004. We can only hope that every lambing season is as successful. The ISBONA internet chat list and many breeders' web sites were a great help in my initial and continuing research. I continue to learn. These sheep are my constant teachers.

Isfaxes Farm is now in Southwest Washington, in a small rural community just north of Portland, Oregon. We enjoy the close proximity to our family, and the beautiful Columbia River Gorge. The flock of sheep now stands at 24, including two rams, two promising ram lambs, seventeen ewes, and three "uncles" (wethers). They are constantly accompanied by Gaston, our Great Pyrenees livestock guardian dog. We are so pleased with Gaston. We always tell people these are his sheep; we just take care of them for him. We often find young lambs sleeping on his back in the sun, or running and bouncing off of him. He truly believes these are his sheep, and you can tell he takes great pride in them. We have never lost a sheep to a predator since we've had him, but have seen him protect the flock from coyotes and neighboring dogs several times.

Farm life

Isfaxes means "ice mane." We try to keep traditional Icelandic names for our sheep. The ewes have taught me a lot about mothering, about good hard work, and about giving your heart, your time, and your tears to an animal



that totally depends on you. There's something that I'm sure touches every shepherd and shepherdess when you work your hardest to save a lamb's life, and you succeed. And it's the same moment that can just tear you down when you don't. These ewes give me a feeling that through them I connect to some cycle of life that is older and more valuable than anything else I've experienced. The way of life they provide for me makes me feel like I carry on a tradition that is now rare. When I pick or wash a fleece, I imagine the generations before me that performed these same functions for survival. I believe that women played a very important role in these traditions. Because of this, I try to give my ewes the names of fairies and goddesses from the sagas. My girls have names like Disa (goddess), Huldís (goddess of mystery), Oskadís (fairy/goddess of wishes), Fjalladís (goddess of the mountains), and Saedis (sea goddess).

Industry

My main interest in the industry surrounding the products of Icelandic sheep is fiber production. The Icelandic sheep has always impressed me with the diversity of color and pattern combinations in the breed. We breed for expression of pattern, fleece quality, and disposition. I knit and have a major interest in learning to felt and spin. I spent much of the summer up to my elbows in fleece, and now eagerly await the next shearing! I wash my own fleece, but have not yet begun to process it further. Hopefully that will happen this winter. I plan to attend my first fiber festival in September of this year (the Oregon Flock and Fiber Festival). I'm excited to meet other people who are involved in fiber production, and learn more about the industry.

We also sell several of our lambs for meat every year. In our experience, the demand is always greater than the supply. The past two seasons we've had to turn people away because we simply didn't have enough. Our meat lambs are grass fed and raised organically. As a vegetarian, I am often asked how I can raise my sheep for meat. I always tell them that my sheep have a happy life, and no matter what their destiny, the lambs on my farm grow up with their mommies, with lots of room to grow and run and play with friends. Many meat producers in this country don't provide their animals with that kind of life. I'm happy to say that I can. We strive to raise our entire flock with room to roam and a natural, chemical-free life.

The color of our flock

I love the expression of color and pattern in the Icelandic sheep. I only have two white sheep in my flock so far, everyone else has color. When I think of what my flock will look like in 5 years, I imagine the hillside speckled with all combinations of color and pattern. Each individual sheep expresses the patterns in a different way. That may sound strange, but some sheep have subtle patterns, some have very crisp and bright patterns. Some sheep look bleached by the sun, others stay deep and rich. Each fleece is precious to me. I don't dye my fleeces, so the natural wool and the differences in color are important. The combination of different hues in each fleece provides a natural tweed and multi-tonal wool.

Our flock's genetics include lines from breeders here on the west coast, but we're looking to expand our genetic diversity. We recently purchased a Morro grandson, and hope to add a spotted sheep or two to our flock in the near future. ■

Notes from Magi's Wood Farm #6

Sheep and the Universe

Magi Shapiro

About ten years ago, my friend, Cas Overton, a Taoist and master of Tai Chi, who unfailingly practices what she preaches, introduced me to alternative veterinary medicine. She had taken her elderly, arthritic dog to an acupuncturist for pain relief and told me that the treatment had been wonderful for him. I was impressed but not so convinced as to turn all my veterinary medical needs over to traditional Chinese medicine, even though my respect for Asian wisdom runs deep.

The Chinese developed their considerable skills over 4,000 years of trial and error with many sorts of natural substances. And over that time, they also developed a holistic view in which all healing takes place in the context of the Universe.

Traditional Chinese Medicine derives from five basic beliefs about the Universe:

- Natural laws govern the Universe.
- Natural order is harmonious and organized.
- The Universe is dynamic; change is constant.
- All life is interconnected.
- Humans are part of the Universe, not outside of it. We are intimately connected to the environment and thus the Universe.

Dr. Bruce Ferguson DVM, of Integrative Veterinary Services, Reddick, Florida, is a practitioner of alternative veterinary medicine. He says that Chinese medicine is based on restoring natural harmony, whereas Western medicine seeks to kill, cutout, or somehow contain the causes of disease.

Although the Chinese point of view is usually not well understood by westerners, it is no accident that a major western drug company is located, literally, across the road from the ancient Chinese medicine market of the City of Xi'an. In 1994, when I first saw the market, I stopped and gaped like the tourist that I was, at an amazing array of the most exotic drugs in the world.

The medicine market is open air with about two acres under roof, and fringe stalls of items piled on blankets on the ground. Everywhere, large burlap bags overflow with roots, flowers, leaves, and whole plants all crowded so closely that it was hard to walk between them. There were piles of antlers, bones, dried animal organs, insects, dried fruits and seeds, herb and mineral concoctions, small sacks of "things", and other things I could not identify even as to animal, vegetable or mineral. I threaded carefully

around knots of thin brown men who gossiped and drank tea, occasionally getting up from worn wooden stools to wait on customers. They smiled broadly at me and didn't mind that I asked a lot of questions. Some of the vendors were locals but most had traveled from all over China to sell their products at Xi'an.

In spite of the confusion of smells and sights, I was surprised at the things I recognized like peppers, madder root, garlic, shepherd's purse, lotus seeds, wasp nest, cinnamon bark, dogwood fruit, and glassy yellow chunks of amber. It seemed that nearly everything that exists in nature, including rock, is a potential medicine. For instance, oxidized iron ore relieves belching, nausea, vomiting, and asthma. The gall bladder of a bear (not found at my Virginia drug store) eliminates heat, subdues the liver and clears the eye of conjunctivitis.

The good news about all of this is that Chinese medicine and procedures are applied to domestic animals as well as people. A frequent speaker at the International Congress on Alternative Veterinary Medicine (usually held in the United States) is Dr. Xie Huisheng, who, in 1994, published a basic text called "Traditional Chinese Veterinary Medicine" that you can order by email [order@hceis.com] from China Scientific Book Services. This book contains explanations of the principles of Chinese medicine and herbal formulas for the treatment of common domestic animals and perhaps sheep, as well.

Although I am unable to confirm whether the veterinarians of China are applying herbal remedies to sheep, it appears that other investigators are very busy in India, Africa, and Central and South America. Unfortunately for us, the plants they use for testing are for local species that do not occur in the United States. Still, progress is progress. I remain optimistic.

Since a fair amount of literature does exist for horses, dogs, cats, and cows (all mammals), it stands to reason that sheep (another mammal) may be similarly treated—always taking into account that caution is necessary when applying treatment from one species to another. Some rare direct references to sheep are contained in 28 pages of that old favorite, "The Complete Herbal Handbook for Farm and Stable" by Juliette de Bairacli Levy. Levy's book is excellent, but it needs updating and editing for accuracy. For instance, "oil of male fern" is not useful information unless she also tells us exactly which fern (and there are many) and what she means by "male." Ferns have a microscopic generation that bears male and female gametes, but I don't think that's what she means.

The Veterinary Botanical Medical Association, www.vbma.org, publishes a good general bibliography for the herbal treatment of animals. Below is a selection of some interesting titles, none of which concern sheep but could be useful for other of your animals. Beyond these titles are several studies and booklets from foreign countries where western medicine is still non-existent and folk ways are the only way.

At this point, I encourage ISBONA to begin to pool titles on herbal remedies for sheep and collect in an organized way the herbal wisdom of the Icelandic Sheep Breeders. I know it's out there, and it is valuable.

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Culling Sheep vs. Selection

John Salmon

One should understand that culling is a process that is used to get rid of unproductive animals - by unproductive I mean a "gummy ewe," an animal with old age problems, etc. It basically has nothing to do with improving the overall flock.

Selection on the other hand has everything to do with improving the flock. There is a big difference between the two. Selection is linked to a breeding goal while culling is usually linked to an individual.

Rather than walking through the flock looking for animals one can "cull", it is much better to walk through the flock looking for the animals that match your breeding goals and rating them. This way one ends up with a "selection of sheep" that do not match the goals in some way or other.

What is done with this group differs according to what type of farm you have. Let's first look at a lamb meat producer - one of his goals is to produce market lambs at a certain weight over a certain time. Ewes that do not do this on a constant basis do not match his goal and thus should be removed from the farm. This is not really culling - these animals will be valuable to some other farm type and are saleable.

Looking at a stud farm - the situation becomes a bit more complex. A ewe with bandy legs may or may not be productive - thus we need to look further into the records for that ewe - does she produce offspring that match the goals? - if "yes" then she stays; if no, then maybe she goes. If she fosters lambs then maybe she should be kept - if she can be bred to another ram and then produce good offspring, then maybe she should be kept.

Basically there is never just one element that makes a decision to keep or get rid of an animal. She might never win a stud show but if she produces the right offspring

then to get rid of her means that the productivity of the flock goes down while a replacement is brought in and starts producing.

For every animal "culled," one has to be purchased - and this is generally an unknown on the farm. It can also open the farm gate to input of health problems.

Generally my selection program looked at five main goal elements - these were rated by weightings across the flock. This then gave a "tail" to the flock. With this tail group - that showed a variation in goal attainment - I again rated them with differing weightings which again gave a smaller tail group. The best of the first tail group were classed "hold" and the rest of the first tail group were placed back. I again rated them with differing weightings which again gave a smaller tail group. Again the best of this group were placed in "hold." Depending how many rating points there were and how many in the tail, the process could be repeated. The ratings would change - i.e. we might rate some of the following categories: 1) overcut and undercut jaws; 2) weight gain of offspring; 3) twinning/triplets, etc (twinning/ triplets is actually low on the rate scale) on own farm.

This will still give you animals that have overcut but produce good lambs and will also give you top animals that produce twins/trips.

One may be able to do this without a computer by only looking at a very small number of selection elements at a time (maybe 2 or 3) but with the computer you can rate 10 or so at a time. The weighting system is pure math.

However, on a small scale, the best approach is to select the best then look at the failures on another selection factor and repeat this as many times as possible. The outcome is that your flock will always have a tail but over time the tail gets better and better. This is called breeding improvement rather than culling.

The most important thing is that "culling" or breeding improvement must be linked to a goal or a number of goals. In a flock that is bred for say black wool - a white wool ewe may look like a good cull decision - but if she always produces a black wool offspring and unless you can replace her with a black ewe that gives black lambs then the culling decision is a bad one.

Culling and selection is what makes a sheep farmer into a good sheep breeder. ■

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There IS Life After Culling!

Gary Holcombe

In the summer issue of the ISBONA newsletter, I wrote an article on the basics of culling which is one very important way to minimize work and inconvenience caused by health issues in your flock. Pointers were given as to how to keep your flock and time input manageable to avoid overwork and frustration. With that article I laid out an exceptionally rigorous program. Culling plans and the replacement of breeding stock turnover rates are generally not so severe. To do what I did cost a lot of money in a very short period of time. Various factors which are a reality in my particular situation encouraged me to take this rather extreme course of action.

- I had very limited space to work with (3.7 acres) which forced extreme efficiency.
- Two large, well-known and very competent breeders were geographically located between me and the great body of potential customers, making it an easy choice to use them for breeding stock purchases rather than travel an additional 9 hours to get to me.
- I needed to become recognized and credible fast, establishing cash flow before the money ran out.
- I felt that with my knowledge of genetics and my prior breeding experiences, I could do well in competition with other breeders and decided that I was going to try to do so.

Knowing that culling is something everyone wishes they didn't have to do, when I seemed to detect a trend of downgrading of the national herd due in part to the sensibilities of those not from farm backgrounds, I decided to use myself as an extreme example, showing others that there is "life after culling" and what culling, coupled with careful, knowledgeable breeding choices, could do.

Other people with moderate and studied goals to gradually improve their herd can certainly take a more modest approach. You can decide upon the rate of turnover you feel comfortable with and can afford financially. If you want to cull all obvious defects, plus have a planned turnover rate of 10% of your breeding animals annually, that is fine. Your herd will improve, albeit very slowly. The most important function of culling is to eliminate obvious defects which would otherwise be passed on, multiplying their effect with each passing generation, pairing up with other and different defects in the genes of your other breeding animals. Without culling, eventually you would end up with a management nightmare. However, if you want a top-notch flock, I would suggest the strict culling out of animals with defects I listed in this past summer's article, plus no less than a 20% rate of breeder ewe replacement annually, and a more rapid 30 to 70% annual rate for the replacement of rams. This assumes of course that you are carefully selecting better animals as you go, maintaining a steady introduction of improved genetics into your flock as well.

Success in achieving a high quality flock is like a four-legged stool. One leg is well thought-out and deliberate culling, another leg is careful and studied breeding choices. The third leg is proper nutrition and maintenance practices like the rotation of pastures to keep parasite levels down, consistent hoof trimming and the like, and the fourth leg would be the proper understanding of genetics, which I would now like to comment on.

While culling is generally thought of as a necessary tool to maintain quality in your herd, I use it also as a tool to force the need to import excellent genetics at a rapid rate, whether in the form of frozen semen, or the purchase of a new animal from some other flock. Your little flock of a dozen animals is too small to generate anything but an occasionally better animal for the use of improving your flock, even with careful planning and breeding choices. A continual influx of superior genetics is necessary to make any real headway in flock improvement. Without culling, careful planning, and the introduction of superior genetics, any improvement in your flock would be essentially accidental. In reality, things tend to go downhill instead. I would like to introduce a concept very new to most people, which would possibly help you be more aggressive in your culling practices, and more consistent in the addition of new and better genetics into your flock.

Often people go with AI genetics from Iceland, or buy an offspring of a super AI ram expecting those improvements to last forever. The animal they buy may be a great improvement and the next generation (the grandchildren of the original AI ram) are still an improvement over what you had, but with each succeeding generation you will notice the effect of the improvement seems to dwindle, the overall effect of the new genetics is diluted, with good characteristics showing up less and less.

Without an additional input of superior genetics and consistent culling, eventually the quality of your herd could be back to nearly the same quality you had before your input of better genetics.

The reason (which I'm sure most of you know already) is that with each succeeding generation, the genetic makeup of any given forebear is halved, then halved again in the next generation. The son of "Mr. Goodbody" has only half his father's genes, the grandson has only 1/4 of "Mr. Goodbody's" genes, the great grandson -only 1/8 of "Mr. Goodbody's" genes. To complicate matters, when "Mr. Goodbody" produces sperm in the process of spermatogenesis, each chromosome strand replicates itself, becoming a double strand, then pairs up with another compatible double chromosome strand, and they twist tightly around each other. Enzymes are then released which are formulated specifically to eat away at specific points of the four stranded/twisted chromosome group cutting the strands into pieces. The pieces then re-

combine into new genetic combinations. Eventually that one cell that originated in the testes ends up having made four entirely different genetic entities, each with half the amount of genetic information necessary for producing an offspring. When united with an unfertilized egg, the genetics of a new lamb are complete.

Unless the ram was very consistent in genetic quality, the four sperm produced from that one epithelial cell would likely range in quality from one individual sperm with a predominance of superior genetics, to one with predominantly inferior genetics, and two with a mixture of superior and inferior genetics. The sperm cell with superior genetics likely being in the minority, its effectiveness in passing on superior genetics is further diluted by the genetics of the lesser ewe that you are hoping to get improved offspring from, making for a real crap shoot that quickly reverts back to mediocrity after only a couple or three generations.

What might be helpful to those who want long-lasting improvement in their herd, is to concentrate on the DNA strand itself, with its billions of bits of genetic information rather than focusing only on the relatively few genes on each chromosome strand. The way to do this is by continually adding new, high quality genetics to each succeeding generation, gradually loading up the DNA strand, eventually almost entirely displacing inferior genetics and providing a high level of consistency in the subsequent offspring. The first generation resulting from a farmbred to AI sire pairing is of course 1/2 AI. The 1/2 AI offspring is then bred to another unrelated AI sire which now brings the AI genetics to 3/4 AI. The third generation bred to an AI sire becomes 7/8 AI, on and on, eventually loading up nearly 100% of the DNA strand with high quality genetics, minimizing the birth of inferior lambs that need to be culled instead of sold.

If you don't want to load up the DNA strand with the genetics of heavily muscled animals, then pick those who are solidly moderate in as many aspects as possible. Hylur, one of the new AI rams, would be a good choice for this.

Of course, after all your hard work, you would want to avoid the reintroduction of inferior genetics which would set your improvement program back, causing you to take generations to weed out the inferior genes you introduced by your mistake. One such potential error that could be committed was discussed back in November '03 when the group of us was in Iceland for training in the vaginal AI technique and being taught how to evaluate and select semen from rams that would correct deficiencies in our own flock.

Mundi was asked about crossing polled Icelandics, (which generally have inferior back muscling,) into horned lines (which historically and typically have superior back muscling). Mundi said, "You can't continue to cross horned with polled sheep...it eventually ruins their conformation."

The reason being that the continued reintroduction of polled lines which typically have thinner back muscling genetics loads up the DNA strand so that it then frequently throws animals with thinner back muscling genetics loads up the DNA strand so that it then frequently throws animals with thinner back muscling.

There are minimums that should be held to in order to maintain quality, and consequently your credibility as a breeder. Hopefully plumbing some of the depths of the culling and genetic selection issues will have inspired more of you to get out of your "comfort zone," do the distasteful thing, cull your flock, and in doing so, reach just a little higher! ■

Linebreeding vs. Inbreeding

Barbara Webb

Line breeding is defined as crossing individuals who share a relationship to a common ancestor, but who are otherwise completely unrelated.

Discussions of linebreeding will suggest going as close as 1/2 siblings; sheep who share one parent, but not the other. That is a bit close for comfort for a lot of breeders, but sharing a grandparent is fine, and in fact may be very desirable. The key is that the ancestor be outstanding, and something that you would like to replicate in the flock. The linebreeding allows you to keep the influence of that ancestor, without it being diluted further and further by subsequent breeding, as you get increasing generations away from that individual.

So 1/2 cousins is plenty far away. The difference between line breeding and inbreeding is that line breeding never goes any higher on the shared ancestor than 50%. Inbreeding sometimes will go higher than that, e.g. a child back to a parent, will result in a share of 75% of that parent, too close to be called line breeding.

Another difference is if you breed animals that share no more than the 50% of the common ancestor, but then who also share other ancestors, that would also be considered inbreeding rather than linebreeding.

Breeding Ewe Lambs

J.D. Bobb, DVM

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Breeding your ewe lambs is a vital part of every sheep operation. They should be your best genetics and the future of your flock. Many purebred producers are reluctant to breed ewe lambs because they do not feel that they will mature to as large a female. Commercial producers know that they cannot afford to feed a ewe for two years before they get a return on their investment.

A set of pregnant ewe lambs require more attention, better quality of feed, current vaccinations, and their own lot. You cannot treat these lambs like they are part of the mature flock. First and foremost they need their own lot with plenty of bunk space. They should never be mixed with larger, older ewes. Ewe lambs in late pregnancy have physical limitations on how much feed they can consume and are easily pushed out of bunk space by larger, stronger ewes. It is much harder to keep ewe lambs in the proper condition; we see many groups that are over fat or under conditioned. Over fat ewe lambs have a tendency to have increased incidence of vaginal and rectal prolapse and lambing problems related to large lambs. Under fed ewe lambs have weak lambs, poor milk production and struggle to breed back with the ewe flock the next year because they never recover their proper body condition.

Ewe lambs need to receive a booster to their Chlamydia, Vibrio, and scour shots that the mature flock does not require. The population of ewe lambs has not been exposed to the diseases that exist in the mature ewe flock. Their immune system is not as stable or capable to handle a disease challenge as your mature ewes. You will need to time the vaccinations to booster their immunity and get their immune system ready for a disease outbreak. We frequently see increased abortions in ewe lambs because they have not been exposed to organisms such as toxoplasmosis. Once they have become exposed they will mount their own immune response and develop long term immunity.

It is very wise to carefully consider the ram that you will breed our ewe lambs to. Do not breed them to the old thick made stud ram. Consider using a ram that should produce easier lambing. ... Usually after one season of using a ram that produces large lambs a producer will be more cautious.

Ewe lambs tend to have fewer lambs than the mature flock. In some cases they will have over a two hundred percent lamb crop, but ewe lambs that are nursing multiple births need special feeding to prevent them from becoming a disappointment as a yearling. I would be happy with a set of ewe lambs that had a 130-160% lamb crop. You will have more death loss in lambs born to ewe lambs. A first time lambing ewe will have less antibodies in her colostrum, and her lambs will be challenged by scours and pneumonia more than a mature ewe. They produce less milk on average and will often wean lighter lambs. There are exceptions, but you will need to feed and care for ewe lambs more intensely than the older flock.

Do not become complacent with your observations when you are doing chores. Always spend a little extra time examining the ewe lambs. Take note of their condition; make sure they have plenty of room when they are eating. My biggest concern with ewe lambs is when they are fed free choice round bales. You are going to fix prolapse vaginas and rectums if they are in late pregnancy with unlimited access to round bales of hay. To make the situation worse they often stand with their front legs elevated reaching for fresh hay.

If you have a lot of multiple births in your ewe lambs, watch them closely for lambing paresis (pregnancy disease) and ketosis. Keep the energy up without them getting fat.

Photo by David Grote



Breeding Ewe Lambs - Part II

Barbara Webb

Fall is upon us with cool, clear weather, reds and oranges flaming in the sugar bush, and the rams getting frisky. The ewes are in high spirits as well as the nights get cooler and the days get shorter. And of course another surefire sign of fall is that the shepherds are finalizing their breeding plans! Those charts and graphs and scrappy bits of lists are being pulled together and shaped up into a coherent breeding scheme. For some breeders, the ewe list will include lambs from this spring. How to plan for a safe and successful lambing season for these little gals? To answer that question, I have compiled the results of interviews with some of our ISBONA shepherds, and will share here their breeding and lambing protocols.

The first, and perhaps most important tip, is to choose wisely the ewe lambs that you will, or will not, put into the breeding pen. I certainly have found through bitter experience that it is not worth the difficulty and heartache to breed a ewe lamb who is still too small. My policy used to be to put them all in the breeding pen, and if they were big enough to breed, then they would. And if they were too small to breed, then they would still benefit from the extra nutrition provided during flushing.

Hah! I quickly found out that I was completely wrong in my assumptions. I discovered to my dismay, that ewe lambs that were much too small to carry a pregnancy successfully, or to be able to mother effectively, will still breed and conceive and even carry a pregnancy to term. Shame on me! I had one spring when I found myself taking over the care of newborn lambs birthed by yearling mothers either without milk, or without the maturity or energy to care for them. That was a lesson I learned quickly and absolutely. If she looks like she is too small, then the best place for her is far away from the breeding rams. There she will put on the growth she needs to breed and lamb safely and effectively, the following year. She may well jump right in with twins or triplets as a two-year old, contrasted with one sad, small and weak lamb her first year, and possibly not much else the second.

Laurie Ball-Gisch had a comment in her correspondence that sums up nicely an effective attitude towards the issue of breeding the young ewes, "I really believe that raising sheep is as much an investment in patience and time as it is money and labor... In deciding to purchase or retain ewe lambs in a flock, one must remember that these lambs should represent an investment in the future of your flock - not an instant return."

I could not agree with Laurie more, and specifically feel that the extra year we give those smallest ewes, will be more than repaid in the years ahead. If a shepherd feels that she cannot keep a ewe on the farm that first year if she is not going to breed and lamb, then it is a much better plan to either send that ewe lamb out as a meat lamb, or to sell them to another farm that will let her grow on.

Experience may tell you how big is big enough to breed that

first fall, but a criteria often found in the literature is 60-70% of her expected mature weight. Raylene McCalmon shares her selection criteria, "(a) minimum of 80lbs and appropriate conformation - the pelvic girdle needs to be wide. I have held back ewe lambs that meet my weight limit but are tall and narrow in the pelvis."

Everyone interviewed agreed that consistent care and support during the growing season is the best guarantee of good results the following spring. While true for all of our ewes, it is especially true for our youngest girls. And one last thought on those littlest ewes - be SURE that they are safe from marauding rams. Come the cooler weather, our rams are very determined breeders, and you will need to be sure that there is no chance of gate crashing or fence leaping on the part of our enthusiastic Romeos!

The next question to settle is if you will handle your ewe lambs separately during any flushing offered, or during the breeding season. *Her nutrition from now until she lambs has everything to do with how the pregnancy and delivery will go and you must control that nutrition throughout.* This cannot be emphasized enough. Too little nutrition decreases the chances of conception, increases difficulty during lambing, starves the udder and results in stillborn, small or weak lambs. Too much nutrition is a guarantee of lambing difficulties with overgrown lambs being born to immature ewes.

The shepherds interviewed had a variety of approaches during the breeding and gestation seasons, but all agreed that close attention is critical. Elaine Clark and Raylene McCalmon both suggest testing your hay supply to see what you have to deal with for winter nutrition. Jimmie Londagin likes to keep his ewe flock, including the lambs, on pasture as far into the fall and winter that his supply will hold. I also, have had good results either sorting for breeding right off the fields, or even keeping the breeding groups on pasture, even if I supplement with hay as well.

There are mixed experiences with grain during either flushing or breeding. A quick summary of my poll results suggests that it is best to make that decision on an individual farm basis. The dangers of grain in the fall are two-fold. The first is that flushing in general, with or without grain, may encourage too many twins among the ewe flock. There are always individual ewe lambs that can twin well and easily, and give us two well developed lambs the following fall. But there are also ewes that will twin on increased rations, but will not have either the mental maturity or the udder development to successfully raise a pair of satisfactory twins. One of the modern farms we visited in Iceland last November has made the decision to stop flushing their ewe lamb flock for this very reason. They found that about half of them would twin, but that the twins would not reach a good meat weight by fall. By waiting until after breeding to offer supplements to their youngest ewes, the lambs in the spring, were good sized singles that made market weight by fall.

Experience will be the best indicator of whether to flush your ewe lambs, or if grain should be a part of the flushing regimen. If you are getting more twins to your yearling

ewes than either you or they can handle, then back off on your fall feeding. If the twins you are getting are good starters at birth that grow out well by fall, then you probably have hit the right mark with your fall nutrition.

Grain in general, either in the fall, or throughout the gestation, is to be handled very carefully with the ewe lamb flock. It is a common experience that we worry about our littlest girls. Are they getting enough to eat? Are the big girls pushing them away from the feeder? Did we miss with our decisions on ewe lamb size? And of course they make those sad Bambi Eyes that Icelandics are such an expert with, convincing us that they are starving! But be careful with that grain bag. Feed as little grain as possible to those young girls, and feed it for as short a time as possible. What the specific parameters will be, is dependant to a great deal on your pasture, or your hay quality and supply, and the size of your girls going into the winter. But a general truth is that it is very possible, and is sometimes desirable, to lamb out bred ewe lambs without having given them a bite of grain.

For our farm, I have found that a good combination of conditions includes keeping the ewe lambs separate both during breeding and gestation. I feel most comfortable keeping them in one group where I can guarantee that they have plenty of access to the feeder without competition from the big, bossy mature ewes. I also find that I can easily feed them the scant grain rations that I use, if I feed them separately. I do not grain my mature ewes at all, but gestate them on hay alone. I have a ready supply of hay, and I am comfortable with the quality, and the mature ewes do quite well under those conditions. For the ewe lambs however, I find that they do best here if they are fed a quarter pound of a 16% protein, sweet feed, starting around January 1, right through lambing. That quarter pound gives her plenty of nutrition to support both her growing body and that of her lamb(s). It is very important to keep a steely resolve when feeding them grain. They will scarf it down immediately, and dig around for more, casting thin and plaintive glances your way. "We are so hungry!", they will say. "Surely, we will never make it through this terrible winter!". But stay firm. Just remember how bad it is to be pulling oversized lambs out of a yearling ewe come spring, and don't overfeed that grain!

James Keith shares his opinion on feeding those little gals, "The most important thing is to not overfeed ewe lambs. They will complain and carry on like they are starving. Be resolute and stick to the feeding plan you have come up with. You don't want lambing problems because of oversized lambs. 5-6 lbs. of good quality first cut mixed hay/day/ewe lamb should pretty well do the trick. Don't start second guessing yourself midway through the pregnancy and up your rations. Err on the side of underfeeding."

Other shepherds do not find it necessary to feed their young ewes separately. They have found offer enough feeder space to offer the ewe lambs, even as they are intermingled with the bigger girls, and they like the convenience of not either breeding or housing them.

separately. I have traded the inconvenience of using one breeding ram for all the ewe lambs, for more control of their feeding situation, and it is the farm plan that I will use again this fall.

James Keith has a compromise plan, as he explains, "During breeding they are in with the other sheep. We strongly believe that the ewe lambs should be housed separately during gestation in order to control feeding. Our experience has been that if they are with larger sheep the older sheep get more than their share at the feeder." He has been able to make individual breeding choices in this way, but still keep a tight control on their nutrition.

Another debate that arose during my interviews, was whether horned ewe lambs should be offered a horned breeding ram. Is she going to have a hard time come spring birthing out a horned lamb? There was a variety of decisions on this topic. Elaine Clark likes to use a horned ram lamb, but she also puts a marker on his chest so she can have an accurate breeding date for the ewe. This allows her to be sure to attend the birth and be available to help with those horns if necessary. At lambing, it is usually just a matter of gently pulling the vulva up over those hornbuds, and it is a small intervention that eases the way for that yearling Mom.

It is a common practice in Iceland to only use polled rams on these immature ewes. We visited a farm last fall that brought in a polled ram each year to breed their ewe lambs. They only raised the horned strain of sheep, but wanted to lamb out their yearlings using only a polled sire. That is the practice that I have decided to use here. Worrying that I will not be at a birth of a horned yearling, I am more comfortable knowing that she is probably not carrying a horned lamb. The downside is that I have crossed the two strains, which is usually not advisable, but I find that for this first year only, the balance is still to the good. The resulting lambs may have to go to meat the following fall if they have some sort of nasty scurs as a result of the cross, but I still like the ease of lambing under those conditions.

To sum up the results of both my personal experience, and of my ISBONA survey:

- Make careful choices of which ewe lambs will be bred, and which will stay back a year.
- Decide if flushing will be advantageous on your farm. The answer will be in the resulting lambs next spring, although a hay analysis may help in making that decision.
- Control the nutrition! This cannot be emphasized enough. Too little means small and weak lambs, and too much means trouble at lambing time. Sort the ewe lambs out from the adult ewes if necessary.
- Enjoy planning your crosses!

Assuming you have successfully navigated these difficult waters this fall and winter, you will have lots of growing bellies in your ewe lamb flock. So next time, some tips on how to lamb out these sometimes squirrely girls without going squirrely yourself! ■



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Felted Holiday Ornaments

Virginia Hinchman

These little Holiday ornaments are a great beginner felting project. They are fun and simple. So long as your felt is strong enough to hold together firmly, there is no requirement for size, evenness or thickness. They are a great craft project to do with kids; even preschoolers can help patting and rolling the felt and decorating. Icelandic, (which is what I assume you will be using) is a very fast and reliable felter.

Fleece for felting need not be perfect. A little staining or hay chaff will not much show in the finished product, so felting is a great way to utilize fiber which you would not reserve for spinning. If you are starting with carded fleece, skip down to the next paragraph. If you are starting with raw fleece, begin by picking. Hold it by the hand full over a newspaper and gently tease the fibers apart to fluff them. Let dirt and debris fall on the paper, and put the picked fleece aside. Next scour (wash) by placing the fleece in a container of very hot (bath temperature very hot) water, to which you have already added about one tablespoon of dish detergent per gallon. Let it soak for about 5 minutes.

Handle gently, don't stir or agitate. You don't want the fleece to start felting just yet. Remove, squeeze out gently, and place in a container of hot rinse water. Soak, remove, squeeze out and set out to dry. You can put your fleece in an old pillow case and spin it in the washer (spin only, no water) to hurry the process. Lightly card the dry fleece next.

If you don't have hand cards it is possible to comb handfals using dog combs. You want the fibers to be separated and aligned so they are roughly parallel to each other.

For each sheet of felt, start with about 1 oz. of prepared fleece. Work on a hard area where water is not a problem. A kitchen drain board works well, or you can use a large rectangular baking sheet with sides. Lay down an even sheet using a quarter of the wool in a 12" by 12" area, with all the fibers going in one direction. Place a second layer on top with the fibers aligned at a right angle to the first layer. Continue with the next two layers. Take about a cup and a half of comfortably hot water, to which you have added a teaspoon of dish detergent, and pour it into the center of the stack of fleece. Press down with your hands, and pat until the fleece is compressed and saturated. Now you start the actual felting. Begin rubbing the wool with a gentle back and forth motion. Press down gently. Move your hands to work the entire surface. Try not to stretch the fiber mass. If your water gets cold, pour it off and add some more hot. You will feel the piece harden and become solid as you work it. With Icelandic it will take about 5 to 8 minutes for the felt to form. When you can pinch some surface fibers and lift the entire piece, it is ready for the last step.

Fulling is the final hardening stage. Roll your felt into a tube and roll/rub it on a ridged surface like a kitchen drain board, or just back and forth between your hands. It will shrink in the direction it is worked in, so reroll and turn it occasionally. This will again take about 5 minutes. When it is firm enough that it will not stretch when you pull on the corners of the piece, it is done. Rinse well, and roll in a towel to remove excess water, or spin in the washer. You can dye your felt at this point (see below) or let it dry and make your ornaments. If you don't want to wait, you can do as I do, and just toss it in the clothes dryer. The dryer will make your sheet of felt a bit puckered, but it will smooth right out with an iron.

If you want color, your felt can safely and easily be dyed using food coloring, Easter egg dye or Kool Aid. This will also work for dyeing small amounts of any protein fiber, roving, or yarn. To 1 cup of hot water, add a half teaspoon of table salt, a tablespoon of vinegar (not balsamic), and either an eighth teaspoon of food coloring, an Easter dye tablet, or one packet of Kool Aid. Stir to dissolve. This is your dye solution. It is enough to dye one ounce of material to a strong shade. Place the damp sheet of felt flat in a microwave able container, add dye solution to saturate, cover loosely with plastic wrap, and place in the microwave. Cook for 2 minutes, rest for 2 minutes, cook for 2 minutes, cool, rinse thoroughly and dry. That's it. It is great fun to make 2 or 3 dye colors and pour on different areas in spots or stripes to "rainbow dye". Just remember if you use too much dye, colors will blend and lose clarity.

Now your felt is ready to make into ornaments. Yes, it is pretty cool just as it is, but get a sharp pair of scissors and start snipping. There is still fun to be had here. You can cut basic shapes, such as circles, triangles, or hearts, use any stencils that are on hand, or trace around your favorite cookie cutters. Now try decorating your felt cutouts. I like to embroider designs and add beading. Buttons, yarn scraps, ribbon, rhinestones and glitter can be glued on. Washed locks of wool can be used for angel hair or Santa beards. Felt gingerbread people are really cute. Designs can be applied with fabric paint or permanent markers. Go crazy. Have fun. Tie on a loop of yarn or ribbon and they are ready to hang. ■



Felting Simplified

Deb Kimball

One of the ways I like to felt in the summer is to arrange the batt of Icelandic wool in a large ziplock or heavy large plastic bag or sheeting - 2 pieces taped to form a bag. If doing a design, add your accent colors to the top now for a blended look or part way through your felting. Now with lots of soap and water begin stumping on the piece - this can turn into a great work out - or involve kids - jumping up and down, marching in place, turning the bag over periodically. This technique can be done in a kiddie pool or the shower stall, or just out on the grass. This works good for smaller pieces, up to 1.5 foot square, perhaps larger if you're more experienced. If you do not pay attention, the piece will not be even in thickness. You would need to continually stop and check, tug, and arrange the wool or add a bit more as the felting begins. Start slowly, as it felts fairly fast. If you want to color each square- you can add dye in the rinse process just after it felts. This can also be done in the bag outside. Let it sit in the sun. This is a good way to experiment with koolaid dyes too.

Holiday on ice

Andrei Vorobei

SPECIAL TO THE ST. PETERSBURG TIMES

REYKJAVIK, Iceland - What is Iceland? A "land of fire and ice." The most northern and distant land in Europe. An extensive island in the North Atlantic, situated two and a half hours from Oslo, five hours from North America and just below the Arctic Circle.

Perhaps a more original way of looking at Iceland, however, is to compare it with another extraordinary European island, but one in the south - Venice.

Thinking about what motivates people, lots of them, to visit either place, we can imagine the whole of Europe balancing between two poles: culture tourism - Venice - and nature tourism - Iceland.

Where Venice is a totally human and complete project, Iceland is a product of nature which, moreover, is still not finished... Manmade Venice is a comfortable place, densely-packed with human culture, but in Iceland, wild and expansive nature exists on its own, often inhuman scale.

YOUNG AND INNOCENT

Iceland is a very new country in both geological and political terms. Indeed, according to a geological reference from a tourist official, "much of Iceland is still taking shape before your very eyes." That's thanks to regular volcanic eruptions - on average, one every five years.

And because over 90 percent of the island's houses are heated by natural geothermal energy (one of the cleanest forms in existence), Iceland has the luxury of being a highly developed country which also has virgin natural areas.

Iceland's history is short, despite the fact that Norwegian Vikings established the first settlements here at the end of the 9th century (incredibly Icelanders still speak a form of the Viking language). It only became a sovereign nation after it gained independence from Denmark on June 17, 1944.

The country hasn't been involved in any serious wars and doesn't even have army. (It is curious, then, as Michael Moore pointed out in "Fahrenheit 9/11," that Iceland is officially at war with Iraq, a matter of public debate and satirical humor here now.) This peaceable, amicable Iceland corresponds excitingly with a local natural feature: you see rainbows - an international symbol of peace and tolerance - almost everywhere every day. In addition to real rainbows, you are welcomed on the way from the airport by a rainbow sculpture by prominent local artist Ruri, who represented Iceland at the last Venice Biennale international art festival.

SMOKY BAY

After a couple hours of flying over the Atlantic Ocean and enjoying mountains in the ocean, you will land at Keflavik, Iceland's international airport, which is 50 minutes by bus from the capital.

Iceland covers an area little bigger than Ireland, but with a population of only about 280,000 people, it is sparsely populated. The overwhelming majority of people live on the coast, whereas the wide central highland part of the island, called "The Interior," is not inhabited at all. Reykjavik, which in Icelandic means "Smoky Bay," is located on the southwest coast and is populated by more than half of the total population of the island.

Reykjavik is not a tall city and spreads along the coast among low mountains and the ocean. Laugavegur, which is for Reykjavik what Nevsky Prospekt is for St. Petersburg, is the main shopping street. This very cozy, narrow and green street is also full of tourist information points, souvenir shops, officials institutions, restaurants, cafes, and nightlife hot spots such as pubs and discos; this street also leads to the city

center. Its zip code, 101, provided the name for Baltasar Kormakur's popular film comedy "101 Reykjavik"(2000).

Omitting the standard tourist entertainment features found in the average European city, Reykjavik's most distinctive attraction is its thermal swimming pools. As every tourist guide puts it, thermal swimming pools are to Iceland what pubs are to Ireland or what coffee shops are to the Netherlands. Swimming is a national pastime in Iceland, and outdoor swimming complexes supplied with steaming geothermal water all year appeal to tourists too.

CULTURE IN NATURE

It is hard to find an analogy to the famous singer Bjork who put Iceland on the world music map, in the field of Icelandic visual art. At the same time, despite its small population, it seems as if the proportion of artists (the majority of which work in Reykjavik) in Iceland is higher than in any other European country.

One of the main state art museums is the Reykjavik Art Museum, occupying three buildings spread around the city. There, along with different temporary international exhibitions, permanent displays from the collections from well-established local artists (including Iceland's pride and joy, the painter Erro) are shown. Temporary exhibitions from a younger generation of artists are also on display.

Another highly recommended place for those interested in contemporary art is the Klink & Bank factory, which gives studios to more than 80 local artists. The organization is very similar to St Petersburg's "Pushkinskaya 10" art center. Temporary exhibitions of current artists also run in numerous art galleries, the most interesting of which are 18 and 101.

Possibly the most interesting place in Reykjavik, both for international and local art, is SAFN, a first-class private collection of international and local artists, now open to visitors.

GEOLOGICAL DISNEYLAND

The main problem with exploring Iceland beyond Reykjavik is that its geological attractions are not concentrated in one place, but spread many dozens of kilometers from each other. What is in between? Up to 70 percent of Iceland is a rocky wilderness resembling a lunar landscape. U.S. astronauts rehearsed walking on the moon here, but this wasteland is punctuated with mountains, rivers and lakes. About 11 percent of the total area of Iceland is covered with glaciers, with the largest in the south and central highlands. The rest is covered with low, green forests and grassland occupied by sheep and horses.

Moreover, much of Iceland's natural wonders are seasonal, that is, every part of the year has its own features and charm. For instance, such interesting natural phenomena as the Northern Lights or the Aurora Borealis can only be enjoyed during late fall and winter.

Meanwhile, such attractions as the midnight sun and activities such as bird watching (including the star attraction for most visitors to Iceland: the puffin colonies), and whale and dolphin watching are available in late spring and summer. All this makes Iceland a country to visit again and again. What you can see and do depends on how long you go for and at which time of the year.

If you are interested in exploring the whole of Iceland, you will need at least three or four weeks. The best way in terms of time and money is to rent a car (to traverse "The Interior" area you will require a jeep). Alternatively, if you don't drive you can use regular bus routes which cover the coast and a few routes across "The Interior."

The main problem with the regular bus, apart from the fact that it is quite expensive, is that it is available only during the peak of summer. Another possibility which could be even cheaper, is to take advantage of the domestic airline.

If you don't have much time or the use of a car, a one-day Golden Circle bus tour (as well as other tours, like whale or bird watching) comes highly recommended. The Golden Circle tour covers Iceland's most exciting natural sights: Gullfoss, which means "Golden Falls," the most famous waterfall in Iceland; and Geysir, the world-famous geothermal area from which the word geyser is derived.

Another not-to-be-missed place for both long- and short-term tourists is one of Iceland's most unique and popular attractions, the Blue Lagoon. It is a sort of oasis in an arctic desert, a geothermal spa set in vast lava fields. This curious half-natural, half-artificial surreal landscape, with its big white plants, milky-blue mineral-rich geothermal water, and clouds of evaporation, is reminiscent of the environment in Andrei Tarkovsky's classic Soviet science fiction film "Stalker" (1979). But unlike the film it is a perfect place to relax whatever the season. Because the Blue Lagoon is located 15 minutes by bus from the airport it is better to visit it on the way to or from the airport in Keflavik. Practically all tourist firms offer the opportunity to visit the Blue Lagoon as a part of their packages, and it is a good way to spend two or three hours.

HOW MUCH DOES IT COST?

Iceland is an extremely expensive country to live and travel in and, after fishing, tourism is its biggest industry. At the same time, there is quite a well-distributed system of youth hostels and camping facilities. Budget airlines such as Iceland Express could help you substantially reduce travel costs.

HOW TO GET THERE?

There are regular flights from St. Petersburg with SAS via Copenhagen, Oslo or Stockholm.

VISA SUPPORT

Iceland is an associate member of the Schengen agreement, which allows travelers to enter Iceland with a valid Schengen visa without any additional procedures. ■

ISBONA Board of Directors' Meeting

August 27, 2004

This on-line meeting was called to order August 27, 2004 by Elaine Clark. The meeting was then conducted by Virginia Hinchman, VP, on September 17, in Elaine's absence as she was en route to the 2004 AGM.

Roll call: Elaine Clark, Stefania Sveinbjarnardottir - Dignum, Helen McFarland, Laurie Ball-Gisch, Liz Harker, Virginia Hinchman, Jim Bailey, Lyle Behl, Jan Jenkins

Approval of May 25, 2004 BODs' meeting minutes as read: Suggestion to accept by Liz; approved.

Treasurer's report:

Please note: First, currently there is only about \$40 in our library fund. Second, the ISBONA opening balance (\$5961.09) shown at the bottom of the report differs by +\$10 from the closing balance shown on the last report. This is due to an addition error.

ISBONA Treasurer's Report (6/04 through 8/04)

	Income	expenses	net profit/loss
Library	\$20.00	\$139.62	-\$119.62
AGM	0	0	0
Posters	0	0	0
Newsletter	\$90.00	\$973.21	-\$883.21

Membership dues income: \$5027.00

Email/web expense: \$ 65.85

ISBONA promotion expense: \$ 397.60

Postage expense: \$ 136.00

Secretarial expenses: \$ 76.54

Bank fee: \$ 15.00

NET PROFIT/LOSS THIS PERIOD \$3333.18

Total ISBONA opening balance = \$5961.09

Net profit/loss this period = +\$3333.18

Total ISBONA ending balance = \$9294.27

(Total includes \$40.20 library funds & \$524.10 from 2003 Silent Auction funds)

Submitted by Janice Jenkins, ISBONA Treasurer.
Suggestion to accept by Liz; approved.

Membership secretary's report: As of August 28, 2004, there are 133 ISBONA members.

Advertising report: Amber Snow reports the following expenditures:

- * New York Sheep and Wool Festival \$65
- * Maryland Sheep and Wool Festival \$90
- * Wisconsin Sheep Festival \$30

Breeders'/Association listings:

- * The Shepherd \$45
- * Countryside \$64
- * BC Sheep Federation N'Ewes \$40
- * Hobby Farms \$120
- * Small Farmers Journal \$72
- * Black Sheep Newsletter \$30.60

Librarian's report: Virginia has nothing new to report at this time.

New business:

a) AGM 2004

i) Agenda: Agenda as per a BOD meeting with membership determining "New Business"

ii) Annual reports: please forward current reports prior to AGM.

b) Nominations and vote for 2004/2005 BOD officers: Lyle made the motion, Laurie seconded, to retain (nominate for re-election) the current officers of ISBONA for another year. Those officers being: Elaine Clark/President, Virginia Hinchman/Vice President, Helen McFarland/Secretary, Jan Jenkins/Treasurer. Approved.

c) Newsletter update: Jen Bailey has agreed to continue publishing (doing the layout, printing and mailing) and to work with Laurie on editing and soliciting articles and ads for the newsletter. A volunteer to solicit ads for the newsletter would be appreciated. Laurie and Jen have decided there will be no more color ads it is not a cost effective venture. In the future all black and white advertisements will be placed at the discretion of newsletter volunteers. The front and back cover of the newsletter will continue to be published in color to highlight photos of the sheep as that seems to be popular with members.

d) Membership numbers

e) Jim Bailey has proffered his resignation as board member and webmaster Laurie made the motion, and Virginia seconded, to accept Jim's resignation. Approved.

f) It was suggested that Jen Bailey would assume duties of maintaining the ISBONA website. Laurie made the motion, and Virginia seconded, to accept Jen as new webmaster. Approved.

g) In order to maintain the current year's number of working board members, the BOD decided to ask Nina Dent to take seat on the ISBONA Board. Nina was runner up to Jim Bailey in the 2003 BOD elections. Laurie made the motion for approval of appointing Nina Dent to the board seat vacated by Jim. Second, Liz. Approved.

h) A motion has been made by Laurie, and seconded by Virginia, to include Jen Bailey on the isboard elist membership, so she can receive regular membership updates for the website work she has agreed to take on. Approved.

i) Laurie made the motion to transfer \$200 from the general funds to replenish the library fund. Second, Helen. Approved.

10. Laurie made the motion and Liz seconded, to adjourn September 17, 2004. ■

Icelandic Sheep Breeders of North America Membership Form

2004 – 2005 ISBONA Membership Fees

(Check one)

- _____ ISBONA Newsletter: \$20 per year
Includes ISBONA Newsletter, access to all official ISBONA-sponsored activities, no voting privileges.
- _____ ISBONA member: \$30 per year
Includes ISBONA Newsletter, access to all official ISBONA-sponsored activities, voting privileges. One vote per membership, must be actively breeding sheep
- _____ ISBONA Website member: \$55 per year
Includes ISBONA Newsletter, access to all official ISBONA-sponsored activities, ISBONA website Breeders Listing with email address and web site link, voting privileges. One vote per membership, must be actively breeding sheep

(Check one)

_____ New Membership _____ Renewal Membership

Name _____

Farm Name (if applicable) _____

Address _____

Phone _____

Email Address _____

Website _____

Flock code (if applicable) _____

Membership runs from August through July of each year. Make check payable to ISBONA. Mail to ISBONA – c/o Helen McFarland, Membership Secretary – 115772 Highway 395, Topaz, CA 96133

Advertising Schedule

Size	Price
Full page 7" w x 10" h	\$35
2/3 page 7" w x 6" h	\$30
1/2 page (horz) 7" w x 4 5/8" h	\$25
1/2 page (vert) 3 3/4" w x 10" h	\$25
1/3 page 7" w x 3" h	\$20
1/4 page (horz) 7" w x 2 1/4" h	\$15
1/4 page (vert) 3 3/4" w x 4 1/2" h	\$15
1/8 page 3 3/4" w x 2 1/4" h	\$10

Publication Schedule

Deadline	Issue/Month
September 15 th	Fall/October
December 15 th	Winter/January
March 15 th	Spring/April
June 15 th	Summer/July

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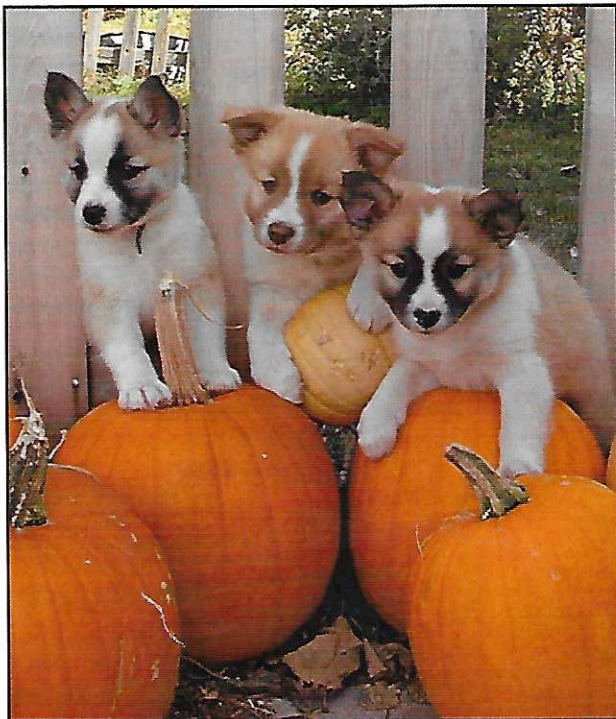
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Front cover and above: Brynhildur Inga Einarsdottir, Borg Farm, Iceland.



The Lavender Fleece's Icelandic puppies enjoy the pumpkins as much as the Icelandic sheep do! See Laurie Ball-Gisch's story on pumpkins on page 27.

ISBONA Newsletter
3826 N. Eastman Road
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