

Classified

FOR SALE: This space! Place your ad here. \$5 each.

**Cornell Sheep Program
100% Virgin Wool Blankets**



Created from the wool of Cornell Dorset and Finnsheep breeds and their crosses. Red stripes near each end and red binding accent the 100% virgin wool. Your purchase of blankets help support the Cornell Sheep Program and \$10 from each sale goes to an undergraduate scholarship fund.

- Lap robe** (60 x 48 inches, 1 stripe) **\$65**
- Single** (60 x 90, inches, 3 stripes) **\$89**
- Double** (72 x 90 inches, 3 stripes) **\$99**
- Queen** (78 x 104 inches, 3 stripes) **\$119**

Add 8% New York State sales tax and \$7 per blanket for shipping.

Purchase at:

Cornell Orchards, Cornell Dairy Store, or Dept. of Animal Science
127 Morrison Hall, Cornell University, Ithaca, NY 14853-4801
Telephone: 607-255-7712 Fax: 607-255-9829
www.sheep.cornell.edu (click on "blankets")

Submissions

J-DSANA accepts submissions of articles, photos, drawings, etc. please send to:

Pat Elliott, DSANA Newsletter Chairman
23246 Clark Mountain Road
Rapidan, VA 22733 USA
Fax 540-854-6443

everona1@earthlink.net

Advertising Rates

1/2 page	\$30
1/4 page	\$15
Business Card (2" x 3.5")	\$ 5
Classified: per issue (\$US)	\$ 5

Dairy Sheep Association of North America
c/o Dr. David L.Thomas
438 Animal Science Building
1675 Observatory Drive
Madison, WI 53706



J-DSANA

Journal of the Dairy Sheep Association of North America

Le Journal de l'Association des Producteurs d'Ovins Laitiers d'Amérique du Nord

Symposium Issue 2006

Volume IV Number 3

Board of Directors

President

Larry Meisegeier
Bruce, WI USA
rrsf@brucetel.net

Secretary

Larry Curtis
Anselmo, NE USA
ewemilk@nebnet.net

Treasurer

Claire Mikolayunas
Madison, WI USA
mikolayunas@wisc.edu

Newsletter Chairman

Dr. Pat Elliott
Rapidan, VA USA
everona1@earthlink.net

Executive Secretary

Dr. David L. Thomas
Madison, WI USA
dlthomas@wisc.edu

Treasurer Elect-in-Training

Stew Cardiff
St. Mary's ON CANADA
rscardiff@wightman.ca

Directors

Nancy W. Clark
Old Chatham, NY USA
clark@blacksheepcheese.com

Stephanie Diamant
Shelburne, ON CANADA
stephanie@sheepmilk.com

Scott Gardner
Auburn, ME USA
scott@1797farm.com

Christine Maguire
Santa Margarita, CA USA
rinconada@earthlink.net

Terri MacKenzie
Fort Plain, NY USA
sburring@frontiernet.net

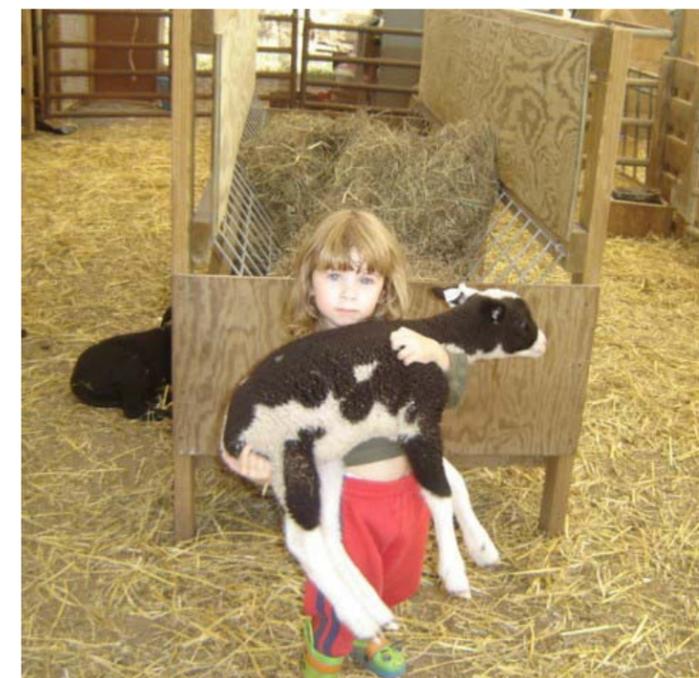


Table of Contents

Editor's notes, <i>Pat Elliott</i>	2
Presidents Message, <i>Larry Meisegeier</i>	3
Proposal to amend imports of sheep semen, <i>Mike Thonney</i> .	3
News from Ontario, Canada, <i>Larry Kupecz</i>	4
News from California, <i>Christine Maguire</i>	4
News from the Southeast, <i>Kristian Holbrook</i>	5
Listeria update, <i>Pat Elliott</i>	5
Ewe Management for improved milk yield and quality, <i>Dr. Pierre-Guy Marnet</i>	6
State of Vermont: Sheep dairy update, <i>Carol Delaney</i>	10

J-DSANA is the official publication of the Dairy Sheep Association of North America

www.dsana.org

Editor's notes

Pat Elliot
Symposium Issue 2006

I am looking forward to the Dairy Sheep Symposium and am hoping to see you there. The program promises to be very informative. When I was just starting out in medicine, I complained to an experienced clinician that I would go to a conference and already knew a lot of the material offered. He said, very wisely, "If I go to a conference and find one or two new things that I can use, I consider that the conference was very worthwhile." I am sure that we will find that and much more.

One of the ACS leaders told me recently that when planning the ACS program, the leaders considered that the networking was the most important aspect. We will be able to do plenty of that also. Take advantage of that opportunity! Other attendees will probably not be marketing opportunities, except perhaps for dairy sheep, but they each have a story, unique and valuable information, and are inspirational to know.

**Membership ■ L'Adhésion**

DSANA welcomes all current or future sheep dairy producers, artisanal farmstead cheese producers, sellers, suppliers, industry professionals, and academic researchers with an interest in sheep dairying, dairy genetics, sheep milk cheese production, and sheep milk based product development. DSANA also welcomes any individual who is a friend of the sheep dairying industry.

DSANA accueille tous les producteurs (trices) de lait de brebis, les transformateurs artisanaux, les fromagers de ferme, les vendeurs, les fournisseurs, les professionnels dans la filière des ovins laitiers, les chercheurs académiques...enfin, tous et toutes qui s'intéressent vivement à la production et à la transformation du lait de brebis. Nous accueillons également les ami(e)s de l'industrie laitière ovine.

Benefits of membership ■ Bénéfices de l'adhésion à DSANA

- ✓ Quarterly DSANA Newsletter • *Journal tous les trois mois*
- ✓ DSANA website • *Site web de DSANA*
- ✓ Discount admission to the Great Lakes Dairy Sheep Symposium • *Tarif réduit pour le symposium annuel des Grands Lacs sur la brebis laitière*
- ✓ Voting rights to help determine the future of the association in the industry • *Droit de vote pour déterminer les orientations de l'Association au sein de l'industrie*

Annual Dues

A principal member is one who is currently milking sheep in a state/province licensed facility, or is actively involved in getting milk to the market, brokering milk sales, producing or distributing sheep milk based products.

Un membre principal producteur de lait de brebis avec un agrément provincial ou d'état, ou êtes-vous activement impliqué dans l'achat ou la vente de lait de brebis aux transformateurs, la production de produits à base de lait de brebis.

Principal Member/Membre principal	\$50 US/ \$62.50* cdn
Associate Member/Membre associé	\$50 US/ \$62.50* cdn
Additional voting members from	\$25 US/ \$31.25* cdn
<i>the same farm or organization/ Autres personnes sur votre ferme ou dans votre entreprise qui désireraient devenir membres votants</i>	

Please make your check payable to:

The Dairy Sheep Association of North America, Inc., and mail to:
Carol Deacon,- DSANA Treasurer
2704 Bridgewater Road
Rock Hills, SC 29730 USA
Tel:803-328-8450
Email: threedog@flashlink.net

*Exchange rate: Due to the fluctuating exchange rate between the US and Canadian dollars, we suggest Canadians check the exchange before sending in membership or submit memberships in US funds (i.e. US money order).

J-DSANA is published three times per year:

November (Symposium issue)

March (Winter/Spring issue)

July (Summer issue)

Deadlines for submission of material is three weeks prior to publishing. The editor reserves the right to move material to future issues if needed. Past issues are available on the DSANA website (www.dsana.org).

Vermont Institute for Artisan Cheese, University of Vermont, www.uvm.edu/viac

You can find most of Vermont sheep dairies and other cheese makers at the Vermont Cheese Council website: www.vtcheese.com. We hope to see some of you next year at the annual American Cheese Society convention and cheese competition that will be held in Burlington, Vermont in July 2007. www.acs.org.

Another note of interest is that Dr. Adam Lock who spoke at last year's Dairy Sheep Symposium on "Milk Fat Synthesis and Its Regulation in Sheep" accepted a research position in the University of Vermont's (UVM) Department of Animal Science. We stole Adam along with Dr. Matthew Waldron, ruminant nutritionist, from Cornell University, recently.

At the writing of this update, I look forward at the end of October to hosting Dr. Antonello Cannas, Professor at the University of Sassari, Sassari, Sardinia, Italy. If you remember back in 1996, he spoke at the DSS with the topic: "Nutritional Strategies to Improve Lactation Persistency in Dairy Ewes". In Vermont he will be giving three demonstrations of the Small Ruminant Nutrition System software program and talking at the UVM Department of Animal Science on "Nutrition of small ruminants in mid-late lactation: effects of carbohydrate sources on energy partitioning between milk and body Reserves."

Look on the Small Ruminant Dairy Project webpage for a new copy of the "2006/2007 New England Dairy/Meat Goat and Dairy Sheep Directory". Free to download or only \$5 per hard copy. www.uvm.edu/sustainableagriculture.

While I can't speak for the State of Maine, visit their Maine Cheese Guild website at www.mainecheeseguild.org. They will be rivaling others in sheep milk cheeses so, maybe they would be a good site for next year's symposium.....?

What Others are Doing

In the Sheep! Magazine for July/August 2006 there is a nice article about 3-corner Farm in New York State owned by Karen Weinberg and Paul Borghard. They started by selling milk to Old Chatham and are now beginning to branch out on their own. Their web site is www.dairysheepfarm.com.



Vermont Cheese Council - www.vtcheese.com

Our Mission ■ Notre Mission

DSANA will promote effective dairy sheep management by educating, supporting and encouraging new and established sheep milk dairies, farmsteads, and artisanal sheep milk cheesemakers.

DSANA fera la promotion de la gestion efficace des troupeaux de brebis laitières par la formation, l'encouragement et le soutien des producteurs (trices) de lait de brebis (autant les débutants que les plus expérimentés), ainsi que les fromageries fermières et artisanales.

DSANA will promote cooperation and exchange of information among producers of sheep milk and cheesemakers. *DSANA incitera la coopération et l'échange d'idées entre producteurs (trices) et transformateurs (trices) de lait de brebis.*

DSANA will also promote the products manufactured from sheep milk. *DSANA fera la promotion des produits fabriqués à partir du lait de brebis.*

DSANA will help producers organize activities for the genetic improvement of dairy sheep. *DSANA soutiendra les producteurs/trices pour les aider à organiser des activités visant l'amélioration génétique des ovins laitiers.*

DSANA will endeavor to inform and educate the public as to the merits and availability of sheep dairy products. *DSANA s'efforcera d'informer et d'éduquer le public quant (aux mérites) à la valeur nutritive et à la disponibilité des produits fait à partir du lait de brebis.*

DSANA will strive to help foster international understanding and the free exchange of ideas between North American based producers and producers abroad. *DSANA s'efforcera de favoriser une meilleure entente internationale et soutiendra l'échange libre des idées entre les producteurs d'Amérique du Nord, ainsi qu'ailleurs dans le monde.*

Conclusion

Adding the losses in milk and usable matter to those in milker time and discomfort that can be endured unknowingly when operating under poor conditions, the losses can add up to impressive figures (up to 20-25%). It is therefore necessary to use animals with good mammary conformation (large cisterns, well drained by vertical teats at their base), good sensitivity to stimulation by the milking machine, and good and sustained oxytocin release during and possibly between milkings. High milk output at milking will ensue and the working time will be reduced accordingly. In more intensive systems, ewes exhibiting low maternal instinct will be preferred to facilitate weaning and adaptation to mechanical milking. The equipment will be adjusted so as to be stimulating (high pulsation rate) and optimize oxytocin release and increase drainage effectiveness and unaggressive (low vacuum pressure) to avoid tissue congestion and poor teat drainage, which would necessitate additional manual operations. All these operations, by better draining the udder, will ensure and maintain better milk yield throughout lactation, all the more so as they are performed frequently in early lactation. In that respect, mixed management appears to be an additional asset if the right to produce is not restricted.

Main references

LABUSSIÈRE J. 1988. Review of physiological and anatomical factors influencing the milking ability of ewes and the organization of milking. *Livestock Production Science*, 18, 253-274

LABUSSIÈRE J., MARNET P.G., COMBAUD J.F., BEAUFILS M. et de la CHEVALERIE F.A., 1993. Influence du nombre de corps jaune sur la libération d'oxytocine luteale, le transfert du lait alvéolaire dans la citerne et la production laitière chez la brebis. *Reprod. Nutr. Develop.* 33,383-393.

LE DU J. 1996. Milking animals other than cows. In proceedings of the symposium on milk synthesis, secretion and removal in ruminants, April 26/27 Berne Switzerland. Ed. Blum J.W. and Bruckmaier R.M. 49-52

MARNET P.G., LABUSSIÈRE J., 1994. Intramammary pressure and luteal oxytocin after PGF2a administration in cycling and early pregnant ewes. *J Dairy Res.* 61, 345-353

MARNET P.G., VOLLAND H., PRADELLES P., GRASSI J., BEAUFILS M., 1994. Subpicogram determination of oxytocin by an enzyme immunoassay using acetylcholinesterase as label. *J Immunoassay* 15 (1), 35-53.

State of Vermont: sheep dairy update October 2006

Carol Delaney
Small Ruminant Dairy Specialist
UVM Center for Sustainable Agriculture

Things have settled down since last year's Dairy Sheep Symposium (DSS) in Burlington, Vermont. The conference work continued for a couple of months after with the settling up of bills (we broke even due to the \$6,000 raised to match the Babcock funds) and writing individual letters to sponsors to thank them and ask them to be as involved in the next DSS which is here already. I want to thank Mike Thonney and David Thomas and others for all their assistance in putting it together and for farmers and others who helped run it. Congratulations to Perry Ells who won the drawing for a DSS symposium on CD for filling out an evaluation survey of the DSS.

A few months after, I was able to enjoy Sardinian hospitality in March and April 2006 when Dr. Giuseppe Pulina and others took time to show me their research and activities there. Sardinia is the same size of Vermont but has 3.5 million dairy sheep and 200,000 dairy goats. They produce about 5% of the world's sheep milk cheese, they claim. Dr. Pulina was the keynote speaker at the 2005 DSS and extends his invitation to others as well to visit them.

For a summary of the sheep dairies in Vermont, we have eight active dairies that make cheese and one farm that keeps a flock of dairy sheep in waiting for a farming partner. This represents about a total of about 800-1,000 adult milking sheep. This year, at the World Cheese Awards in London, Willow Hill Farm, LLC, owned and operated by Willow Smart and David Phinney, took a gold (first place) for *Alderbrook* and a silver (second place) for *Vermont Brebis* - both in the soft ewes' milk category. At the American Cheese Society Annual Competition this year held in Portland, Oregon.

There were 941 entries for 22 categories. Vermont cheesemakers brought home 28 awards and eight of these were for goat or sheep cheeses and products. Willow Hill Farm brought home ribbons for *Summertomme* and *SheepYogurt*.

We have at least three places that offer cheese making workshops in Vermont:

Woodcock Farm with Mark Fischer, Peter Dixon and others

Ag-Innovations with Larry and Linda Faillace,
www.rootswork.org/three_shepherds.htm

President's message

Larry Meisegeier

Greetings fellow dairy sheep enthusiasts. It's October and once again I find myself wondering where the summer went. Most of us are done milking for the season and breeding is under way with the anticipation of a new milking season.

Here at River Ridge we finished our season in mid September with a total for the year of 90,000 pounds of milk produced and marketed. Although this was the same total as last year, it was an improvement as we did this with fewer ewes.

It has been a busy summer for us, our oldest son was married in August and we have done all the preparation ourselves. We did an outdoor wedding catered by our family and the bride's family with home grown vegetables and fruit, homegrown and roasted lamb, home made breads, pastries and cheese, and we even made homemade wine and beer for the occasion.

The newlywed couple has taken over her family's farm and they are busy setting up a sheep dairy with plans to begin production next season with a group of ewe lambs they received as a wedding gift.

The symposium planning committee has put together another great program again for this year. I'm sure there will be something for everyone.

During the symposium we will be holding our annual meeting. There will be board of director terms expiring and we will need to elect new board members. I would like to encourage everyone who feels they could have something to contribute to consider running for a position on the board.

I would like everyone to give some serious thought to what direction you feel our organization should be going. What do you expect to get out of your membership? Is an annual symposium and this newsletter enough, or should DSANA be doing more?

I feel that there is much more that DSANA could do and offer. If you look at the American Dairy Goat Association for example, then we have much more to do.

The ADGA offers registration of animals, collection and correlation of production data, sire summaries,

This newsletter/Dairy Sheep Association of North America will not be responsible for any mishap resulting from an individual(s) following any advice published in this newsletter.

Materials submitted for articles or advertisements will be subject to the approval of the DSANA. Views and opinions represented in this newsletter are not necessarily those of DSANA.

sanctioned live animal shows and a scoring system to reward show wins, an appraisal system to evaluate individual animals, a national convention with educational seminars, trade show, spotlight sale of exceptional animals and the list goes on.

Should DSANA offer some of these services? I realize that not everyone would be interested in all of these things, however, we have a diversified membership from commercial producers to hobbyists and everything in between. Perhaps some of you would like to show your animals. Some may feel their animals are more valuable with registration and others, such as myself, are most interested in production recording and sire summaries.

I would like to hear more opinions and discussion about this in the future.

Proposal to amend imports of sheep semen

Mike Thonney
Cornell University

In the Wednesday Federal Register, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) announced a proposal to amend the regulations regarding the importation of animal germplasm by removing specific restrictions on sheep semen from regions where scrapie exists. The proposal also requires the inclusion of additional information on the international health certificate accompanying sheep and goat semen.

According to APHIS, experience and research have convinced the agency that sheep and goat semen pose a minimal risk of transmitting scrapie. This action would relieve restrictions on imported sheep semen while continuing to provide safeguards against the introduction and dissemination of scrapie.

Comments that were received on or before Oct. 10 were given consideration. The American Sheep Industry Association provided comments to this proposal.

For complete details, the Federal Register accessed at: <http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/E6-12934.htm> . Staff contact: Paul Rodgers, 303-771-3500

This could be very important for importing dairy sheep genotypes from Europe.

News from Ontario, Canada.... It's like, the lay of the land, eh?

Larry Kupecz
Kupecz Family Farm
Burgessville

Greetings from Ontario Canada. A special thanks and congratulations from us to the Dairy Sheep Association of North American (DSANA) for facilitating the 2006 Great Lakes Dairy Sheep Symposium.

It was suggested recently that a letter from Ontario would be a welcome addition to the DSANA newsletter highlighting the symposium and I have found myself with the pleasure and honour of providing one. Ah! But where to begin... Ontario is the same as everywhere else in the Universe... it is a just a little bit different. That makes our views on things, how we manage our sheep and how we market our milk seem a little odd at times. Just like our tendency to say "zed" instead of "zee" or having a peculiar habit of putting in an extra "u" in words like "labour"; our views on milking and marketing are tainted by our past and topography; it's like...the lay of the land, eh?

One thing to remember about Ontario is that we are coming out of an era of a distinct split in duties between milk producers (farmers) and milk processors (cheese makers). The great divide happened about 40 years ago with the advent of a thing we call Supply Management. Back then there where no sheep milk producers. It would have been hard to find a goat milk herd and we had five or more breeds of dairy cattle. Dairy farming meant milking cows--period. Now don't get me wrong. Supply Management has made for relatively stable and prosperous cow milk farming. This deal unwittingly included a pact with the processing sector which ensured that there would be little chance for farmers to integrate into making cheese. Health laws blended into this picture to produce a firm barrier to anyone thinking of a farmstead or artisan approach to milk processing. Supply Management and health laws, coupled with a relatively flat demand for milk and technology offering ever more efficient milk production, spawned an entry barrier into cow milk production that we call "quota". Basically it is the right, on paper, to produce cow milk. Basically, it makes it next to impossible (or financially silly) for anyone not presently milking cows to get into it. On the processing end, technology created an ideal situation to consolidate all the little cheese plants that used to populate Ontario into a few shiny, industrial factories that churn out

ubiquitous, industrial cheddar, mozzarella and process cheese in assembly line efficiency. And what this environment has created is a vacuum for specialty, artisan type cheese. Our aging demographic and urban prosperity gives us a home market to die for. Our well-heeled consumers are discovering "local food" and "culinary tourism". Small ruminant (read – anything other than cows) milk is in strong demand as it has none of the restrictions associated with "quota" and supply management.

One would think that with this "lay of the land" that one couldn't go wrong in setting up an artisan cheese plant in Ontario and specializing in sheep milk products for the local market. A number of factors have made the road to a prosperous sheep milk industry a tad bumpy. The wheels fell off some early start-up attempts at sheep milk processing. Rules and regulations have worked against us. Border and trade issues and a rapid increase in the value of the Canadian dollar have made for an interesting time both on the farm and in the cheese plant. There is what could be termed "active disinterest" in government service to agriculture in general and innovative needs of niche farm markets in particular. We milking shepherd's feel very much on our own.

So this is the lay of the land in Ontario. There's plenty of potential, but we're on the steep incline part of the experience curve. Are we going to live long enough and cooperate well enough to see it through? Maybe some future "letter from Ontario" can give some hints as to how we are doing.

News from California

Christine Maguire

The good news from California is that the market for artisan cheese, and especially sheep's milk cheeses, is huge and growing. The national trend is for the consumer to know the source of his or her food, to support locally sustainable agriculture, and to find new culinary experiences began in California. Although there is some price resistance at the high end, there's plenty of room for expansion. This year saw production increases for the only two licensed sheep dairies in California — Bellwether Farms and Rinconada Dairy. Both were prize winners at the American Cheese Society conference in Portland, Oregon.

Oregon and Washington have larger numbers of dairies, and Willamette Valley Cheese in Oregon took several prizes at the ACS. The less good news is that, although there is great interest among potential sheep

release is less effective if the mother does not establish her maternal instinct, i.e., if the first sucklings are not performed. So a 24-h maximum contact between ewe and lamb is beneficial, and the lambs remain easy enough to train for artificial suckling. Although this remains to be verified experimentally, our results and those of "controle laitier" would tend to show milk yield to be higher as mixed management lasts longer. These results could be easily explained by the establishment and repeated stimulation of a strong ejection and secretion reflex, effective in early lactation, which would potentiate the ability of the cellular mechanism to synthesize milk to the end of lactation. Lastly, mixed management permits functional selection based on the morphology of the udder and teats because as a rule the ewes not capable of suckling their lambs are removed from the flock. Consequently, flock homogeneity is greater and milking is easier. Although no reliable data are available in that respect, the users of the various methods have not reported any significant effect on udder pathology.

Milking machine

The milking machine must be stimulating enough to ensure strong milk ejection during the very short milking time. Also, ewe milking includes time-consuming manual operations (stripping and possibly "re-milking") that should be reduced to a minimum, in particular by selecting well-formed udders.

Proper setting of the machine however may help increase the productivity of the milker and at the same time simplify his task. Initially, choosing a pulsation rate as high as 180 ppm was motivated by the need to emulate the natural conditions of lamb suckling as best as possible. All our experiments aimed at comparing pulsation rates from 60 to 180 ppm have shown that milk yield is very slightly higher when the rate is set above 120 ppm. The mechanical milking and stripping milk volumes do not vary significantly, but the most spectacular effect is an increase in the re-milking volume at 60 ppm, whether the pulsation ratio is 33 or 50%. Pulsation ratio trials tend to show that ratios below 50% would incompletely drain the teats. Oxytocin assays elicited significantly lower release in that case, and it can thus be concluded that a pulsation rate below 120 ppm is too low to stimulate Lacaune ewes and does not ensure total drainage and retrieval of all the usable matter. It should be noted also that cup drop is more frequent (with rubber liners) when the pulsation rate is low.

The vacuum pressure chosen is between 36 and 53 kPa. The most recent tests we performed showed that the vacuum effect is mainly sensitive on the percentage of

milk retrieved after stripping. This may be due to a disruption of mammary drainage induced by teat elongation, liner clambering and very obvious congestion of the teats. This effect therefore is more a physical one. However, considering that the vacuum pressure setting is a trade-off dictated by the weight of the bundle and the need to prevent it from failing off, the solution could be to operate under lower vacuum pressure (36 kPa) with lighter bundles and better gripping liners (silicone). However, with no air intake at the clamp, the rated vacuum pressure under the teat may transiently exceed the regulator pressure and damage the teat while increasing the leukocyte count. It is therefore recommended to maintain some air intake, even if it means increasing the vacuum reserve slightly. The best trade-off would therefore imply low vacuum pressure (36 kPa) and high pulsation rate (180 ppm) with a 50% ratio. Note that with such a setting the leukocyte count will be higher than with a lower pulsation rate. There is no upper aggression on the mammary tissue. In fact that effect is only sensitive in animals with leukocyte counts above 200,000 cells per milliliter (sterile controlled milk). So the increase in leukocyte count is only the result of the expulsion of the cells contained in the alveoli, through which they enter the udder. This clearly confirms better drainage induced by oxytocin and permits earlier detection of possible udder infections. Lastly, the choice of liner is crucial for optimal application of the machine settings to the teat. There is no impact on milk yield if the milker performs proper stripping. This means that the teat liner has to be chosen carefully to facilitate physical drainage of the udder. Silicone liners appear to reduce cup drops and liner slipping and are therefore recommended. However, the most spectacular effects are produced by the design of the cup and the flexibility of the liner body. Stripping is highly reduced when the cup diameter is increased to restrict teat squeezing at the end of milking. Otherwise air intake is facilitated and cup falls are more frequent. A very hard liner may increase stripping considerably because it moves more slowly and remains open longer than a softer liner. Indeed milk outflow can be accelerated but the effect of that on the teat is deleterious (upper congestion) and the liner clambering is more marked. The flaring pressure for ewe liners is thought to be close to 10 kPa.

A number of factors are yet to be tested or re-tested because of the ongoing standardization of milking equipment for small ruminants. Further advances are still possible through blood oxytocin assays, measurements of teat congestion and udder immunological condition assessment, as indices of the physiological effect of the equipment and of udder health.

oxytocin release, vertical teat placement will warrant effective milking, which can be simplified by automatic disconnecters, a technique known to reduce overmilking and improve teat health in cows. Among the various ewe breeds, some have milk emission kinetics with a single outflow peak, high volume emission (a characteristic of Friesian ewes). If there are fewer of these ewes with oxytocin release at milking than the more highly selected Lacaune ewes, it is nonetheless true that these animals offer large cistern volume and the ability to transfer alveolar milk into cisterns between milkings. This ensures that synthesis will not be hindered and that the secretory potential will not be reduced throughout lactation. In addition, poor setting of the milking machine or the presence of milking-refractory animals will have less impact and milking will be simplified.

The effect of oxytocin release between milkings on the distribution of milk in the udder and on milk yield has been verified. It appeared that if blood oxytocin is maintained throughout the day at the same level as during milking, the storage volume increases in proportion with total milk and the alveolar milk volume slightly decreases and holds. The result is a 18 to 25% increase in milk yield. Whatever the reason, good milk transfer between milkings thus appears to be as important a factor of better milk yield and easier milking as milk ejection during milking. It is worth noting that luteal oxytocin could be among the factors causing that transfer, because milk transfer in the cisterns increases when there is sexual activity. Other milk ejection factors have been evidenced in ovaries, which led us to deepen our knowledge of the relationship that exists between the ovarian sphere and the udder.

Oxytocin titration is not informative on the occurrence of milk ejection because the important factor is the form of release rather than the amount of oxytocin released. Indeed, sustained oxytocin release results in high intermammary pressure during milking and thus quicker and complete draining of the udder. There is also a very small number of cases when oxytocin release occurs and has no effect on the udder. There are multiple reasons for that but the most likely ones are the absence or deactivation of receptors on the mammary gland. Catecholamine release may also occur at the peripheral level, reducing mammary blood flow to a point where the oxytocin level is no longer sufficient to ensure effective alveolar contraction. Considering the costs of oxytocin assays and the necessity to perform several of these tests in the course of one milking, the method should remain experimental

or at the most be used to select the best breeding ewes in breeding units.

Ewe management at milking

There are a large number of different ways to manage dairy ewes. In the very intensive Mediterranean systems, ewes are managed in the same manner as dairy cows and weaning occurs immediately after lambing, followed by exclusive milking to the end of lactation (150 to 200 days). In that case, the lambs are artificially reared and are difficult to train because they never learn from their mothers. In many cases, however, a variable suckling period precedes exclusive milking. In the most extensive flocks, lambs are suckled to weaning. In intermediate cases, the point is to provide colostrum cover and to await the seasonal opening of specialized creameries such as those of the Roquefort region in France. In that case, however, the milk production in Lacaune ewes, which has doubled in 20 years and largely exceeds the intake capacity of the lambs in the early stages of growth, no longer permits exclusive lamb suckling without hindering lactation. For that reason and, according to some authors, milking has been combined with suckling for complete mammary gland drainage and to train the ewes to come to the milking pen. How to choose between those systems? According to Labussiere's results, it appears that the more the ewes suckle their lambs, the greater difficulty they have to give their milk to the machine while releasing oxytocin. The drop in milk yield observed at weaning (23 to 35% according to breed) and explained mostly by the reduced frequency of daily drainage (-20 to -25%) but also by the mother-lamb separation effect (estimated at -3 to -7%) inhibiting the ewes' adaptation to mechanical milking. Mixed management never really reduced the drop in milk yield at weaning. This is clearly explained because our recent studies have shown that as long as the ewe has daily contact with her lamb, she refuses to release oxytocin at milking, whereas she does it without any problem when suckled (selectiveness). The proximity of the lamb in the milking pen (unfeasible in practice) restores the milk ejection reflex, which demonstrates the necessity of the lamb effect (most probably olfactory and visual) for milk ejection to occur. Ewes however get used to the milking pen and passing to exclusive milking is made easier by their calmness. As early as 48 h after lamb separation, the ewes begin releasing oxytocin at milking, contrary to exclusively suckling ewes, a proportion of which will never adapt. The rate of adaptation to milking is also the same as that observed in ewes turned to exclusive milking upon lambing. This latter method however has to be considered with caution. Our studies show that oxytocin

dairy ranchers, there are still only two licensed producers in California and not many more in the rest of the west. There are several reasons for this, and perhaps the biggest is the cost of land. And in a region where it does not rain at all for six months of the year, feed costs can far outstrip the profits to be made from dairying and cheese making. The costs of complying with regulations can be prohibitive for a beginning dairy. Over the past nine years, we have seen many students from the Farmstead Cheese Course at Cal Poly University who have expressed interest in the industry, but so far there has been no new activity toward licensing.

Genetics has also been a concern as the pool seems to be fairly small. We have found that here in southern California the East Friesian ewe is far more hardy than we were told. However, based on information from Yves Berger at the 2004 DSANA conference, we decided to diversify by adding Lacaune genetics through artificial insemination (quite a procedure!). The resulting lambs this past spring were the largest and most robust we've had. We'll see about the milk production next spring.

News from the Southeast

Kristian Holbrook

At Blackberry Farm we have finished our dairy construction to grade A specifications and are working on the cheese plant. We have decided to sell ewe's milk yogurt to the public and will be using an interesting incubation system from Harold Schuller. Our next big project is developing a Karakul East Friesian cross that will work for milk production.

We will be purchasing milk for yogurt from our neighbor Ronnie Rogers who will be milking the sheep he purchased from our friends at True Ewe and Pat Elliott as well as ewes purchased in Wisconsin. Ronnie has been in the dairy industry for 20+ years and has been brave enough to switch from Holsteins to sheep. He also has a good time watching us spend too much money on fancy milking equipment and has been very helpful in getting us set up to receive milk from outside sources.

Tim Clark and Sheri Palko nextdoor to us in Knoxville have been making great cheese and raising fall lambs. Last I heard, they were enjoying a day with our state milk testing lab techs. Jon Treffert at Himmel Alm farm in Powell has also been busy taking care of fall lambs and touring his cheses through Europe. He said he hasn't been kicked out of anyones house for making bad cheese yet!

Our loosely knit group still meets monthly and we are always hoping to meet more people in our region to expand sheep dairying in the Southeast.

Listeria update

Pat Elliott

Nancy Clark has sent us a most interesting article detailing research conducted by Cornell over a three year period to monitor sources and subtypes of Listeria in their dairy and processing environment. The article will be published soon. We are publishing the abstract here with permission from M. Weidmann. In the article I noted that drains seemed to be one persistent place that listeria was found, as well as floors. This article emphasized the importance of sanitizing those areas.

Longitudinal monitoring of Listeria monocytogenes contamination patterns in a farmstead dairy processing facility, by A.J. Ho, V.R. Lappi, and M. Weidmann.

Abstract

Contamination of dairy products with *Listeria monocytogenes* is a concern since multiple human listeriosis outbreaks have been linked to contaminated cheese and dairy products. Dairy production on farmstead operations maybe a particular concern since *L. monocytogenes* is also an animal pathogen that can be shed by ruminants with and without clinical symptoms; physical proximity between production animal and dairy processing facilities may thus provide a higher risk for introduction of *L.monocytogenes* into the dairy production process. To better understand the risks of *L.monocytogenes* contamination associated with farmstead dairy production, samples from a farmstead dairy processing operation and the milking barn of the directly adjacent dairy sheep operation were tested for *L.monocytogenes* over 3 years. *L.monocytogenes* prevalence for samples collected on the farm (n=85) and the dairy production facility (n=674) was 9.4 and 2.7%, respectively. Molecular subtyping using automated EcoRI ribotyping of *L.monocytogenes* isolates revealed that distinct subtypes were associated with the dairy production facility and the farm's milking parlor. While a total of 5 and 4 different ribotypes were identified among isolates obtained from the dairy production facility and the milking parlor, only one ribotype (DUP-1030A) was isolated from both. Different ribotypes were predominant among isolates from the dairy production facility (ribotype DUP-1052A, representing 15 of 18 isolates) and the farm's milking parlor (ribotype DUP-1039A, representing 4 of 8 isolates); each of these ribotypes appeared to persist over time in the respective area. Our data support that (i) in farmstead dairy processing facilities *L.monocytogenes* present on the farm can largely be prevented from being introduced into

the processing facility; and (ii) *L.monocytogenes* can persist on farm and in processing areas, providing a potential high-risk source of contamination. Preventing cross contamination between dairy production and processing facilities and control of persistent *L.monocytogenes* are thus critical to assuring the microbial safety of farmstead dairy products.

(**Key words:** *Listeria monocytogenes*, on-farm dairy production, automated ribotyping)

Ewe management for improved milk yield and quality

Dr. Pierre-Guy Marnet
Professor and Scientific Director
Team for Dairy Sheep Research
National Superior School of Agriculture and National Institute for Agricultural Research
Rennes, France

Introduction

There are a number of methods to improve the quality and quantity of milk, some of which have been neglected in the past 20 years. Indeed, much work has been dedicated to feeding and genetic improvement of milk yield and composition, but milk retrieval at milking has been considered as secondary because milking equipment technology has not considerably evolved. But now the gains to be expected from feeding are reduced, investment returns are increasingly uncertain, and work is more complex. In Europe, the extension of milk quotas (restriction of the right to produce) to small ruminants have encouraged farmers to seek technical solutions to improve the quality of the milk and at the same time simplify working procedures. Some of the answers to their plea lie in a better understanding and exploitation of the milk ejection mechanisms.

Review of milk synthesis and ejection

After a phase of mammary growth (secretory alveoli and ducts) mainly controlled by ovarian steroids, the milk surge, or lactogenesis, will necessitate stimulation of secretory cells by a number of pituitary hormones; prolactin and ACTH in particular. Note that inducing lactation artificially only requires steroid administration to prepare the udder for these pituitary hormones before turning the animals to milking. Milking, through udder stimulation, induces the release of a hormone compound necessary for the ultimate phase of mammogenesis and the induction of lactation. Once lactation has been induced, its maintenance will require, in addition to the above hormones, other hormones that

preferentially act on mammary metabolism, such as growth hormone (GH). There again, it is worth noting that udder clearance is always followed by GH release. This also explains the so-called lactation maintenance reflex linked to mammary gland stimulation. Once the milk has been produced, it still has to be drawn from the udder, otherwise drying-out will occur very quickly. This means that the accumulation of milk, adding to the lack of the hormones required for milk synthesis, will stop the cellular mechanism. Two reasons have been put forward. First, pressure in the secretory alveoli crushes alveolar cells and impedes secretion vesicle transfer and also slows down the passive passage of elements from blood to milk. The second cause is thought to involve one or several lactoserum peptides (Feed Back Inhibitor of Lactation : FIL) which, by accumulating in the alveoli, would have an inhibitory effect on lactose synthesis. This clearly demonstrates the importance of thoroughly draining all the milk contained in the alveoli at each milking. But thorough draining requires the active participation of the animal. Indeed, if between milkings the milk is partially discharged into the cisterns in the lower part of the udder, some of it remains in the alveoli and in the small galactophores at the top of the udder. That milk contains much more fat because fat cells are larger than the diameter of these small ducts. To be extracted, that milk must be expelled from the alveoli by the pressure applied on the alveolar wall by myoepithelial muscle cells. These cells spontaneously contract (smooth muscle cells), but the ejection of milk will only be effective if their contractions are synchronized, which can only be achieved if they are stimulated by a neuro-pituitary hormone, oxytocin. There again, the release of that hormone in blood results from a neuro-humoral reflex initiated in the udder. So optimizing milk ejection comes down to retrieving the milk and usable matter that was produced through genetic selection and feeding and thus optimizing the animals' potential. The milk, by going down into the cisterns, increases the intramammary pressure and the pressure ratio between the cisterns and the mouth of the sucking lamb or the machine vacuum nozzle. This also accelerates draining and makes milking quicker.

Lastly, if all information transits through the central nervous system, it is likely that the CNS may act as a modulator of response to udder stimulation. For instance, the connections of the oxytocin-producing hypothalamic nuclei (supra-aortic and paraventricular nuclei) to the limbic system, which is the emotion site, and the cortical areas which are the memory sites, explain why recognition of an anxiety factor (biting dog, stranger in the

farm, sudden replacement shepherd, bleating of lambs, undergoing such treatments as injection or foot trimming, shearing noise) may inhibit oxytocin release and hence milk ejection. Other factors, on the contrary, may facilitate milk ejection. In suckling farms, it is the sight and cry of the young and in dairy farming, when all is well, the sight of the usual milker, the starting of the vacuum pump and/or pulsation, entering the milking pen and above all concentrate feeding in the milking pen. It has to be noted that there is a close relationship between oxytocin and another peptide: CCK (cholecystokinin). Although this has not been proven in ruminants, the CCK released at the peripheral level when the feed bolus reaches the stomach is thought to induce oxytocin release and might therefore promote milk ejection. However, CCK may also be released at the central level, which controls rumination. But oxytocin may in turn induce CCK release. This implies therefore that rumination nearly always follows oxytocin release and milk ejection. An animal that does not ruminate in the milking pen is therefore under unfavorable conditions and surely does not express its full potential.

So respecting the animal, stimulating it as much as possible may appear coarse (but not that easy) but is necessary to extract all the secreted milk as quickly as possible and to maintain lactation.

Milk ejection

Milk ejection, which in dairy cows usually occurs during massage and in the first minutes of milking, has to take place within only two milking minutes in ewes. It therefore requires careful animal selection and optimal setting of the milking machine. Milk ejection can be monitored during milking without using any invasive technique and without bothering the animals. Measuring the milk emission output at milking is sufficient. The technique has produced very interesting results in terms of the distribution of milk in the udder and is still a reference method for selecting animals according to their milking easiness. In ewes, milk generally flows in several stages. The first outflow peak corresponds to cisternal milk discharge. Then a second outflow peak occurs only if the nervous connection between the udder and the CNS is unimpaired. That outflow therefore depends on oxytocin and represents the volume of milk trapped in the small galactophores and the alveoli. That milk is called the alveolar milk. Lastly, a third increase in outflow is noted at the time of stripping. That milk fraction represents the milk kept below the teat in the mammary gland pockets. But if the ejection of alveolar milk is incomplete, the massage performed during stripping and the tap stimuli

applied by the milker under the udder will help in retrieving all or part of the alveolar milk with that fraction. Note that in the early days of mechanization, the poor performance of the machines, and the large number of ewes that did not respond to mechanical milking stimulation forced the milkers to perform hand milking to retrieve residual milk after removing the milking bundle. That operation is now rarely performed.

In 1982, almost half of French Lacaune ewes were unresponsive and necessitated time-wasting and tedious stripping and manual re-milking operations for all the milk produced to be retrieved and collected. In 1995, only 7 to 8 % of these remained and essentially among ewe-lambs. Those ewes which only emit their cisternal milk have lower milk yield, less rich milk (up to 70% of the fat can be trapped in the alveolar fraction between milkings) and poor lactation persistence. These ewes therefore are removed from the flocks. It should be noted also that ewes with poor reflex have a lower milk outflow, inducing protracted milking times. It is therefore important to carry on selecting ewes according to their milk emission kinetics. Nowadays, because of the sharp increase in the volume of milk produced, it is frequent that the cisternal milk has not finished flowing when the alveolar milk ejected by the action of oxytocin reaches the teat. As in cows and goats, it becomes difficult or impossible to distinguish between the two emissions and to measure their respective outflow. At the most, the reflex is known to have occurred if the milk emission kinetics lasts for more than 40 sec. with a high outflow, which is the maximum time for effective oxytocin release. There is a good correlation between the cisternal milk volume and milk yield. That volume currently represents as much as 38% of total milk yield on average. The alveolar milk volume is similar (34%) and so up to 28% of total milk is represented by stripping milk. Stripping is therefore mandatory. But a large part of that stripping milk is linked to the mammary gland morphology, not to a problem of effective milk ejection. Selection according to milk production performance has resulted in larger cistern volumes, partly due to the enlargement of the pockets at the base of the udder. Consequently, the teats are higher and their position precludes complete drainage of the mammary gland. Furthermore, that teat position makes the fitting of nozzles more difficult and may induce air intake or bundle disconnection detrimental to the udder health (impact on teats and increased risk of germ contamination). It is therefore crucial, as in dairy cows, to select ewes in consideration of their udder morphology and by choosing animals with teats as vertical as possible, properly draining the udder. Combined with a good