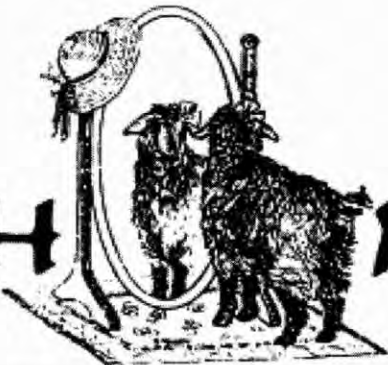




CASH MIRROR

Volume 8, Issue 12

October 1997



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Cover photo:

Paul Johnson, Goat Knoll

"Put your left foot in and you shake it all about..."
(Grace shows the herd the Hoky Poky.)

Black Sheep Gathering

June 20 - 21, 1997

Eugene, Oregon

**A Lot of Good Stuff
and a Little Cashmere...**

Right: D. "Bing" Bingham, Capital Press Correspondent, finds the Gathering a good place to meet women. Fortunately his wife was there to keep him in line...more or less.



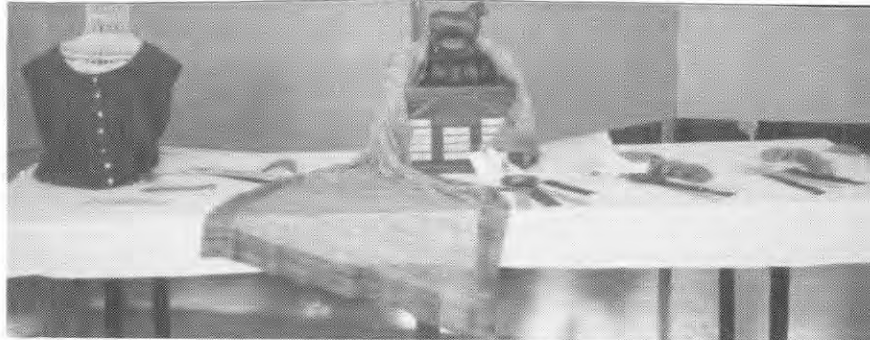
A lot of booths with spinnables...only a little cashmere.



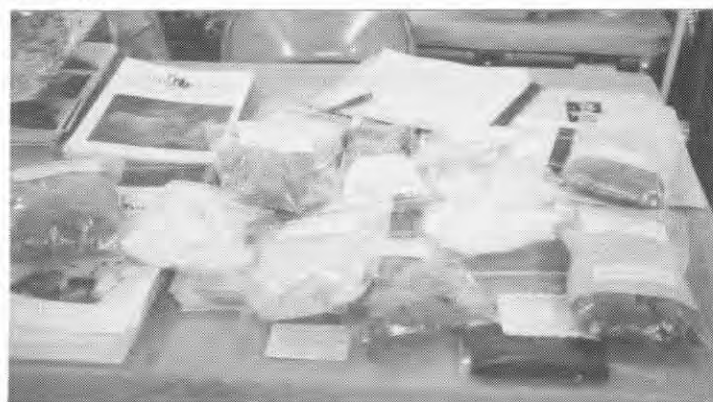
Herding dogs doing their "thing" with sheep—a demonstration.



Carrie Spencer, Foxmoor Farm demonstrating hand dehairing cashmere.



Fiber Arts Winners, left to right: Jean Tollis's wool vest, Alice Sherp's merino/silk/mohair wedding ring shawl (Best of Show), Cynthia Heeren's 100% cashmere fine spun 2-ply yarn, Sally McCarrick's Pygora spun yarn.



Cashmere and various other fiber samples—brought by Angus McColl, Yocom-McColl Testing Laboratories.



Doug Maier, Breezy Meadow Cashmere Farm and his booth full of cashmere goodies.

Reflections

by Paul Johnson

Leaving on a Jet Plane—With Goats!

We recently had our first experience with shipping goats. A nice couple from Michigan had flown to Oregon to visit relatives in Portland, and to look at cashmere goats. They had first contacted us via e-mail and were looking for animals to add to their newly-acquired acreage in Michigan.

Last Saturday, the couple came to our farm and "met" our goats. You don't have to spend much time looking at bucks this time of year to agree that does and wethers are a better choice for starting out. The couple quickly passed on the idea of a breeding pair and decided to look at young kids, thinking that, perhaps, these would be easier to transport home.

Two of our favorite and most friendly kids, the infamous Stardust and a white wether named Jolly were in the barn when I arrived with the visitors. While I went downfield to find the herd, Stardust and Jolly entertained the visitors. By the time I returned from playing herd dog, bonding had already occurred between the kids and the Michigan folk. Even though I caught and showed them several other goats and neither Stardust or Jolly was the color of goat they had intended on purchasing, the bond prevailed.

The next step was to get the kids to Michigan from Oregon. It was determined that the Stardust and Jolly would fly with their new owners, much like one would expect to transport a favorite pooch. Since this was Saturday and their return flight was scheduled for Monday, time was of the essence. The Michigan couple arranged transport with the airline and we tried to figure out what health papers they might need for the authorities. Our ever-helpful vet zipped a pair of coveralls over his church-going clothes early Sunday morning in order to examine the kids for their health inspection.

So, early Monday morning I dressed for work, packed the kids, along with their water bucket and box of hay, in the back of the Bronco and headed to town. After a late start and a side trip to my office (much to the amusement of the office staff) I left the city for the Portland airport.

PDX—Portland International Airport—the airport of continual, ever-changing construction projects. First, the departure lanes had changed dramatically over the weekend. The departure drop off area was now

several hundred yards away from the terminal. And it wasn't just several hundred yards of walkway—it was several hundred yards of man-made construction work in progress, plus traffic jams, hundred of travelers hustling everywhere, cement trucks, buses and one lone goat-mobile hunting for a couple from Michigan. Police and traffic directors swarmed over the place, blowing whistles, pointing everywhere at once, with jets and jack hammers competing for the top noise levels.

As the goats and I cruised coolly through the mayhem, I heard my name called and pulled off to a temporary "curb." Since the porter who was supposed to bring the animal transport carriers had not yet arrived, I left the truck in chaos while John and I carried the kids through the maze of people and construction to the terminal.

One construction worker we passed leaned on his shovel, tipped up his hard hat and commented, "I suppose those goats are going on a plane!?"

"Yup," I replied. "They're on their way to Michigan."

He shook his head and resumed worked mumbling, "Now I've seen it all!"

Meanwhile, people we passed kept turning with classic double-takes. "My word! Those are goats!" City folks aren't dumb. They know goats when they see one...or two.

When we finally arrived at the terminal, I turned Stardust and Jolly over to their proud new owners. The kids had been perfectly behaved throughout the entire ordeal. They hadn't made a sound and, as usual when carried, snuggled in for the ride. As a crowd gathered around the goats, wanting to photograph and videotape the event, we hurriedly said our good-byes and I rushed off to rescue my illegally parked goat-mobile. Luckily the Bronco was still there and hadn't even been ticketed. Perhaps the strange smells drifting from the back had helped.

I don't yet know the end of the story. I felt somewhat guilty leaving two new goat owners on the curb in front of the Delta terminal, but they seemed to be enjoying the adventure. We are eagerly awaiting e-mail from Michigan. Hopefully Stardust and Jolly haven't been absconded by the Michigan goat police.





When Readers Talk...

Paul and Linda,

Continue to much enjoy your work in and with *CashMirror*.

FYI, local shepherds here still use goats with their sheep in order to encourage the sheep to graze new territory (re: Goats as Leaders for Other Species, August 1997).

Thanks.

Sanford Bottino
Double Eye Farm
Ojo Caliente, New Mexico
September 12, 1997

The following letter was sent in response to Lee Coray-Ludden's letter printed in the August 1997 CashMirror where she asks for input from readers.

"To brush or not to brush; that is the question. Whether 'tis nobler to brush out the cashmere from the hide of the struggling goat, or let it be sheared by 'ere so fleet passing shearer...or perhaps to try to capture the tufts of fluff from the voice of the wind after we've waited too late for either..."

RE: To Brush or Not to Brush

Our herd here at Hi-Plains Cashmere has topped over 200 head including kids. We experimented with the combing approach a year ago and increased the number of goats that we combed this last Cashmere harvest. Having experienced most of what she has observed, I would have to say that Lee has

obviously touched upon several key points that a person needs to address before undertaking the combing approach. The main issue that needs to be decided is how this fiber is going to be used or marketed. This needs to be decided prior to its harvesting! This is why we combed only a small group one season. Getting the timing down is very important and varies from goat to goat. By observing the fleece types in our initial combings, and how they could be harvested with as few combings as possible while still having as little guard hair as possible, we were able to get a handle on our herds' timing.

Fortunately, they don't all shed at the same time, so even with 200 head facing us, we can schedule daily combings without living out in the barn. For us, this was a decision born out of necessity, since our temps. would range from tolerable to sub-arctic in just a few hours. The only way we could ensure that they could handle this extreme shift was to comb them. The plus to this weather was that it slowed down the shedding considerably.

Having experienced our herd in its various phases, we have developed a plan of both shearing and possibly coating those shorn, as well as combing selected goats with fleeces that are more appropriately combed than others. The advantage to this approach is many fold. I can sell the raw fleeces that I shear, or send them off for dehairing if my market for dehaired Cashmere requires such. As for the combed, it is ready for spinning straight off of the goats. I spin so this is a plus to me. Yet, I can't spin it all myself so the other options are very helpful in keeping my delicate fiber moving instead of being stock-piled and going out of condition.

Value added always returns the most per unit of product, but it also requires a lot more commitment of time and energy to achieve. By the way, we are blessed with several goats with high yielding fleeces that don't shed and produce fiber year round. These require special handling and can only be shorn since, as Lee pointed out, it won't come out no matter what!

As for determining yield, we weigh all of our fleeces combed and compare total harvested weight. All things being equal, this year was done the same with every

Continued on next page

goat. By paying attention to their individual shedding patterns, we were better able to retrieve the fiber before it started to come off to any degree.

Our goal is to have goats that fit our operation. A one-ounce yielding goat better have some very good attributes she's imparting to her off-spring to stay around for the next season.

We have noticed that the goats that we combed the year before in our initial experimental group actually produced significantly more fiber the next season. The fiber was also longer. I understand that this may have been caused by the stimulation of the hair follicles.

When we shear this season we will apply the accepted classing approach of estimating the yield by its visual characteristics. Having an initial fleece weight and tracking the final outcome, either dehaired or classed by a certified classer, will help us determine how we'll categorize the individual goat.

We have used old T-shirts as covers for a few days and that has gotten everyone through the worst of the post-shearing adjustment. Our weather in Western Nebraska is very similar to Lee's in Alaska, without the midnight sun.

We have concluded that the nice thing about having Cashmere producing goats is all of the alternative ways to harvest and market the fiber. The hardest part of raising Cashmere producing goats is all of the ways we have to select from in harvesting and marketing our fiber! The Zen of Cashmere Goats!

Julie Becker
Hi-Plains Cashmere
Mitchell, Nebraska
September 29, 1997



Goat Recipes

By Martha Wells

Flylo Farms Oberhasli, Normangee, Texas

Grilled Leg. Sunday afternoon, we grilled a large leg of goat. I first took all the fell (silverskin) off that I could get, then rubbed it with sea salt, chipotle peppers, and some cumin. John put it on the outside grill long enough to sear, then we wrapped it in foil and cooked it slow for about 2 hours. I just dumped a head of garlic in with it, and after a while, I smeared the soft garlic over the meat, and drained the juices out of the foil.

Granted, it wasn't as tender as I've had it, but it was moist and very tasty. We ate it with a baked acorn squash and a salad.

Rice and goat meat. Monday evening, I slivered about 2 cups of meat off the bone, warmed in its original juice I'd saved. I cooked a pot of rice and dumped it in the skillet with the meat and a portobello mushroom cubed. It had improved in flavor, if possible. It's now Tuesday, and I STILL have leftover meat for at least another meal and lunches.

Barley Soup. I continued the leg of goat by cutting some of it into cubes, and putting the bones and cubes back in a pot of water. When it boiled, I added about 1/2 cup of barley and cooked that till the barley was done. Thinly sliced red cabbage and carrot and small cubed potatoes made this a very filling stew.

Cabrigo Tacos: Brown one pound of ground goat meat with about 1/2 medium onion. Add hot peppers and season as you like it. Add a 4 oz can of herdez, or other green tomatillo sauce. Cook until the water from the canned sauce is condensed and the meat is well cooked.

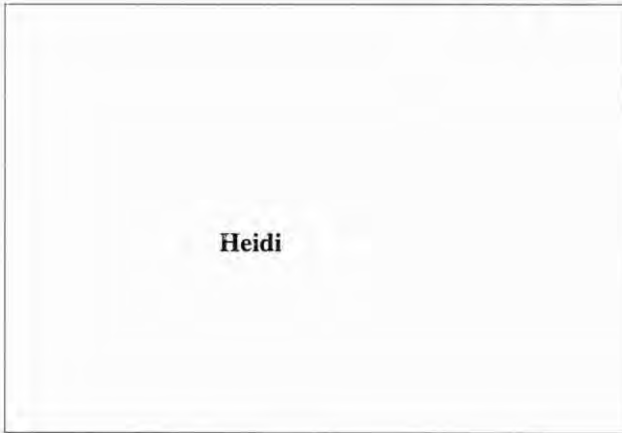
We like flour tortillas because they hold up well to this. I usually make 2 for John and one for myself, but this recipe will make about 6. Spoon a large spoonful of the meat mix into a warm tortilla. Have some warm beans or warm refried beans to add or to serve alongside. Add your favorite grated cheese; Monterrey Jack or pepper jack is good here. A dollop of sour cream if your waistline can stand it; ours can't. We usually add "Texas Gunpowder," or other dry chili powder just before eating. If it brings tears to your eyes, it's about hot enough!

This is very good, but make sure your goat is ground well. The butcher tends to toss in gristle and other hard to digest parts in "chili" meat, and I won't even get my chevon/cabrigo in chili meat anymore. Either go all the way and get ground "chuck," or just get a roast and cube up for chili meat yourself.

Note: Graham Kerr (Old Galloping Gourmet fame) had a recipe for Roman leg of Goat, and he proclaimed no one in this day and age would have access to goat, so he substituted a leg of lamb. Not the same critter at all! I wrote him and told him!

Fiber Goats Go to the Fair

By Heidi J. Smith
Heidi's Farm, Park City, Utah

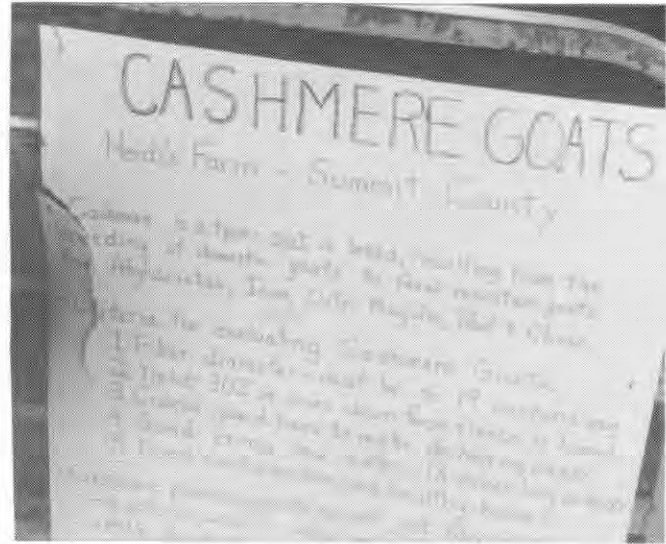


Heidi

Heidi Smith (left) and Jacquee Gillespie spinning goat hair in the goat barn at the Utah State Fair

The Utah State Fair just ended and I had the opportunity to display my cashmere goats this year along with the rest of the group known as the "other" goats. That group includes any caprine not being raised predominately for the size of their udders: Boers, Packers and Saddle goats, Angoras, Cashmeres, and Cashgoras all fit into that category and all were invited to participate this year which was the first of what we all hope is a new trend for our fair. I spent 4 full days in the goat barn with two of my favorite girls, Jezebel and Astra. I demonstrated spinning, weaving, and knitting cashmere and they demonstrated what being a goat was all about for the uninitiated. I made signs for the pens, I had old issues of Cashmirror and brochures to pass out and recruited a cadre of fiber volunteers to demonstrate and answer fiber goat related questions. Jezebel spent the first day attempting to mutilate or kill anyone who trespassed the bars on her pen. Considering some of the aberrant human behavior she was forced to endure, I thought her response quite appropriate. First, there were all the children who wanted to pet her and grab handfuls of her fluffy hair; they were the least of her troubles. Then there were the adults who just had to grab her horns, or her tail. God only knows why. Astra wisely laid down in the far corner where no one could reach her and went to sleep but Jezzy was unable to relax. One man decided that it would amuse his girlfriend if he and Jezebel butted heads. He leaved way over the rail and into the pen and made all of the goat-like motions indicating a headbutting was desired. I have no doubt Jezebel would have obliged him if I hadn't intervened.

Next door there was an angora doe named Isadora who just went catatonic (or is that goat-atic?).



Part of Heidi's display sign on the goat pen—that torn part on the left is where the goats demonstrated their preference for signs over pen straw.

Anyway, she ceased to eat, drink, or respond to her environment at all except for panting incessantly in the corner for the first 24 hours. She then had to be sent home in an emergency attempt to revive her as she succeeded in wiping out her entire microbial gut colony. I am pleased to report that she did indeed survive after some expensive veterinary intervention and a prolonged quiet rest at home.

I was not allowed to sell any fiber, yarn or hand made goat hair articles while demonstrating although I certainly could have done so. I answered the same questions at least a bazillion times: Cashmere really comes from a goat? How did you get that mohair purple? Why do your goats have horns? and Why do you cut off the ears of La Manchass?

Which brings me to the most important question: Why did I put myself and my goats through this



Astra (white) and Jezebel (black) in the "pen." (Jezebel is cleverly camouflaged to the right of Astra.)

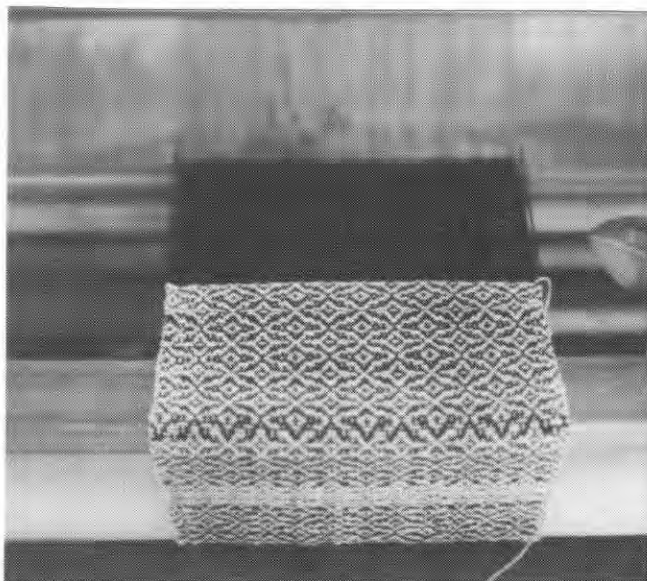
Goats at the Fair

Continued from previous page

deal and what did we get out of this event? Since there was no monetary remuneration, standard economic theory dictates that I must have received something of value even if it is something not easily measured. For starters, hanging out in a barn full of goats and goat people is actually my idea of fun. Throw in the opportunity to spin and weave while I'm there, for the most part uninterrupted except to occasionally save some idiot's skull and what few brains he may possess, and we've pretty much described my version of heaven. Educating the public about the value of goats and allowing them to experience them up close and personal I do for the sake of the much-maligned goat more than for the edification of the public. Exposure and advertising for the possibility of future sales looms in the back of my mind as well.

So far, I haven't heard from any of those hundreds of people who took my card and promised they would call right after the fair. I guess it could still happen though. As for public relations, the girls appeared one morning live on the local TV news program. Unfortunately, I wasn't there and I didn't see it since I was still asleep when the film crews arrived at the barn at 5:30 a.m. as were most of the rest of Salt Lake City's inhabitants. Finally, 4 days at the Utah State fair provides me with funny stories about people and goats to last through the year.

Will we do it again next year? You bet! But, next year we intend to get paid for demonstrating and sell our wares. All I've got to do is dress up like a pioneer goat herder and stay 15 hours a day for 11 days with the rest of the merchants and actors. I know Jezebel is already looking forward to it too.



Cashmere scarf on the loom—Heidi wove it during the fair.



Jacquee demonstrating a drop spindle and explaining once again, "Yes, cashmere really does come from a goat."



Rita Miller who raises, spins and packs with llamas, educating the public about fiber and fiber animals



Every kid should ride a saddle goat! Children were also taught how to milk a goat.

Goat Breeding

Artificial Insemination

vs.

Natural Breeding

By the Irvine Mesa Charros 4-H Club



Two methods of breeding are commonly used in goats:

Natural Breeding: In natural breeding, a doe (female goat) in heat is bred to a buck (a male goat).

Artificial Insemination: In artificial insemination (AI), frozen semen from a buck is defrosted and inserted into the cervix of a doe in heat. Goats conceived by AI look and act just like other goats.

Each form of breeding has its own advantages and disadvantages.

Advantages of Natural Breeding

Simplicity: Goats have been breeding naturally for centuries. As an owner of a doe, you must decide which buck to use, but the buck takes care of the rest.

Cost: If you don't own a buck, many goat owners will allow you to breed your doe to their buck for a fee. In our area, this fee ranges from around \$35 to \$100 depending on the quality of the buck. Most also charge a fee of around \$1 a day to care for your doe if you must leave it to wait for it to come into heat. If you own a buck, your costs include the purchase price (from \$150 to \$800 in our area) and the cost of feeding and housing the buck. You can make some money breeding other's does if you do own a buck.

Timing: A doe is in heat from 12 to 36 hours, and after breeding naturally semen can live for about 24 hours. It's not essential to breed at exactly the correct moment, and it's easy to repeat the breeding for a few days.

Disadvantages of Natural Breeding

Difficulty in managing a buck: Bucks require sturdier fences than does, and are usually housed away from does. During breeding seasons, bucks have some unusual behaviors such as urinating on their beards. This creates an offensive smell that attracts does but only does seem to appreciate it.

Variety: If you own your own buck(s), you'll have only a few to choose from. If you use a buck that belongs to someone else, you'll still have a limited supply to choose from within driving distance. If you don't have a trailer or pickup truck, it can be inconvenient driving your doe to be bred.

Cost: Bucks frequently cost more than does, and you'll probably have to own several because you usually won't want to breed the offspring of a buck to that buck. Bucks also eat more than does, and destroy their fences more frequently.

Advantages of Artificial Insemination

Cost: Once you have the necessary equipment, frozen semen is much less expensive than paying a breeding fee. Typical prices range from \$5 to \$25 per "straw" of semen. You can also avoid the costs of housing and feeding a buck.

Variety: Straws are available from many high quality bucks, including National Champion bucks, and sires and siblings of National Champion does. It's possible to quickly improve the quality of your herd using such resources.

Disadvantages of Artificial Insemination

Timing is critical: The best time to AI a doe is right at the end of the heat cycle. Defrosted semen remains viable at most 12 hours. Therefore, it's important to know exactly when the doe went into heat and how long she remains in heat to be successful.

Cost: The initial cost of the equipment can be high. The most expensive equipment is the tank to store liquid nitrogen (used \$100-300, new \$600-1,000). It costs about \$35-50 dollars to fill the tank with liquid nitrogen, and this must be repeated every 2-4 months as the liquid nitrogen evaporates. A tank will usually hold 300-1,000 straws so it's possible to share among several goat owners. Some people rent space in a tank. The remaining equipment (lights, sheaths, etc.) totals less than \$100.

Artificial Insemination Equipment

The necessary equipment includes a liquid nitrogen tank, "straws" of semen, tweezers (for removing straws from the tank), a straw cutter, (for cutting off the wax plug keeping the semen in the straw), an open ended glass speculum, a small light (to make the cervix visible), a thermos (for holding warm water to defrost

Continued on next page

CASHMIRROR

AI vs Natural Breeding

Continued from previous page

the semen), a thermometer (for measuring the temperature of the water), an insemination gun (a thin metal tube with a plunger to push the semen out of the straw) and disposable plastic sheaths (to hold the straw while in the gun).

Care must be taken in working near liquid nitrogen, since it is -361°F and can cause severe cryogenic burns.

The sources listed below sell semen, equipment, instruction manuals and instruction video tapes.

Magnum Semen Works
2200 Albert Rill Road
Hampstead, MD 21074
<http://magnumsemenworks.com>
vrhoten@ccpl.carr.lib.md.us
410-374-2927

No cashmere semen available

Buck Bank
2344 Butte Falls Hwy
Eagle Point, OR 97524
503-826-2729

Cashmere semen available

All American AI
Andy & Ida Purcella
Rt. 1 Box 605
Coquille, OR 97423
541-396-3448

**Some cashmere semen available
Will have more in November**

Frozen Assets
Karen Lewis
P.O. Box 493133
Redding, CA 96049
916-549-3825

No cashmere semen available at this time

North East Caprine Semen Cooperative
Monique Roeth, Sect/Treas
3118 Cole Hill Rd
Berne, NY 12023-9720
518-797-3075

No cashmere semen available

Information reprinted (with permission) from the University of California, Irvine, Irvine Mesa Charros 4-H Club home page at <http://www.ics.uci.edu/~pazzani/4H/InfoDirtRoad.html>

(For information about current availability of cashmere semen, Paul contacted the AI vendors.)

Page 10, October 1997



Buck in a beaker

Artificial Insemination of Dairy Goats

John F. Smith, Extension Dairy Specialist now at
Kansas State University

INTRODUCTION

Artificial insemination (A.I.) involves collection of semen from a buck and transfer of the semen to the reproductive tract of the doe. Does can be inseminated with either fresh semen or with commercially available frozen semen. This article discusses use of frozen semen to artificially inseminate does.

Reasons the dairy goat producer may consider using A.I. include the following:

1. Eliminate or reduce the cost of maintaining bucks.
2. Increase the rate of genetic improvement.
3. Increase the number of does to which a buck could be bred.
4. Through use of estrous synchronization, A.I. allows several does to be bred the same day.

Continued on next page



Blauw Dak Ranch
10640 Freeman Rd.
Birkenfeld, OR
97016

Bill De Jager
503-755-2005
(phone and fax)

Cashmere Goats
Maremma Guardian Dogs
Home of
Genghis Khan

A.I.

Continued from previous page

Whatever the reasons for using A.I., it is important the producer fully understands the reproductive cycle of the doe, and correct semen handling and insemination procedures.

REPRODUCTIVE CYCLE OF THE DOE

In general, dairy goats are seasonal breeders. The breeding season is initiated by decreasing daylight and runs from late August to January in the United States. Estrous cycles can be initiated out of season by controlling artificial lights to simulate decreasing daylight. The goat's average estrous cycle is 21 days. However, individual does can have either longer and shorter intervals between heat periods. For this reason, it is important to keep individual reproductive records on each doe. The duration of heat or estrus is typically 24 to 36 hours with ovulation occurring near the end of estrus.

HEAT DETECTION

A producer's heat detection program is an important factor in determining whether an artificial insemination program will succeed. Knowing when a doe comes into estrus lets the technician time insemination so it more nearly coincides with ovulation.

Symptoms of does in heat are:

1. Does that are unusually aggressive, noisy or active,
2. Females that stand to be mounted by herdmates,
3. Decreased appetite and milk production, and
4. A clear mucous discharge from the vulva.

It is important to establish a heat detection schedule during the breeding season. Does that are to be inseminated should be observed twice daily for 15-20 minutes. Early morning and late afternoon are good times to observe estrus. Observing does for heat detection only during chore time may result in estrus ewes being overlooked because of their change in behavior as they anticipate feeding.

Accurate records should be maintained, including time of heat, length of heat and length of time between heat periods. These records will help a producer accurately anticipate and detect heat in individual does, and time insemination with ovulation.

TIME OF INSEMINATION

As discussed earlier, a doe is a seasonal breeder that cycles about every 21 days. The average heat or estrus will last from 24 to 36 hours with ovulation occurring near the end of estrus. The standard A.I. rec-

ommendation is to breed does two (or three) times at 12-hr intervals. This breeding schedule increases the possibility of a healthy sperm contacting a healthy ovum. It is essential that does be inseminated before ovulation so that sperm cells can undergo a process called capacitation. If records establish the average length of a particular doe's heat period, one can breed the doe once using the schedule shown in Table 1 and probably achieve satisfactory fertility:

Table 1. Breeding time chart*

If doe's normal heat period length (hrs.) is:	Breed her at this time after first observed signs of heat:
24	As soon as the doe show estrus
36	Within 12 hr estrus
48	24 hr after estrus
72	48 hr after estrus

*In all cases, if doe is still in heat 24 hrs after first breeding, breed her again.

EQUIPMENT NEEDED TO INSEMINATE DOES WITH FROZEN SEMEN

1. Liquid nitrogen tank
2. Speculum (25 x 175 mm for doelings or 25 x 200 mm for does)
3. A.I. light
4. Straw tweezers
5. Sterile lubricant (non-spermicidal)
6. Insemination gun (for straws)
7. Breeding stand or facilities to restrain the doe
8. Thaw box
9. Paper towels
10. Straw cutter
11. Thermometer

These supplies can be obtained from several livestock supply companies. The liquid nitrogen tank will be

Continued on page 26

CRR Cashmere Goats & Alpacas

Goats, Alpacas and Fleece for Sale



Tia and Peter Rosengarten
Box 37, Weston, VT 05161

Tel. (802) 824-8190

Fax (802) 824-4072

Castle Craggs Ranch

Named 1997 Montana Family Business of the Year

Castle Craggs Ranch of Hamilton is one of seven businesses named 1997 Montana Family Business of the Year in an annual award competition sponsored by the College of Business at Montana State University-Bozeman with support from Mass Mutual.

The business, also called Three Bags Full, is a family business owned and operated by Steve and Diana Hachenberger of Hamilton. It won in the new business category.

Other winners throughout the state included Hardy Construction Co., Billings, small business category; Wetzels Quality Cleaners, Billings, oldest category; Crismore Logging and Road Maintenance, Libby, surviving in trying economic times category. Borrie's Family Restaurant of Black Eagle won in the medium-sized business category, D.A. Davidson & Co. of Great Falls won in the large business category and Great Falls Paper & Supply Co., Inc. won the very small business division.

Judges selected the winning family businesses from 80 nominations. The companies will receive their awards at a seminar/luncheon to be held September 26th at the Gallatin Gateway Inn near Bozeman.

The awards call attention to the many positive contributions made by family businesses to Montana's overall economy, according to Karen Vinton, professor business management in the college of business at MSU-Bozeman and coordinator of the Montana Family Business awards program.

"The average time these businesses have been in existence is 52 years, which demonstrates that succession and success can go hand-in-hand," Vinton said. The seven winning businesses also make a significant contribution to the state's workforce, employing a total of 528 employees.

"These are businesses that have made a conscious effort to contribute to their communities and the state," she said.

Castle Craggs Ranch produces cashmere, fine wools and sells garments made from their products. The business has quickly found a productive niche. The Hachenbergers started the company in 1991 when they purchased 12 Australian cashmere goats. The herd now numbers 250 and is the second-largest in the state. The company grows the cashmere, dyes the

fiber, hand-knits the garments. The family's efforts led to the first patent for a dehairing machine, or a device that separates coarse, guard hair from cloud-soft cashmere fibers. The invention could have major implications for the cashmere industry.

The 1997 Montana Family Business of the Year winners will represent the state in the national contest.



Diana and Steve Hachenberger
(Steve's the one under the blanket)

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PRODUCTION SYSTEMS FOR GOAT FIBRE IN EUROPE, AFRICA, AND THE AMERICAS

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Ed Note: This paper was presented at the International Goat Conference in Beijing China in May 1996. Mr. Laker has graciously allowed us to reprint this important summary of fiber goat production systems. Adjust your reading glasses; this is good stuff.

SUMMARY

Fibre is an important product from goats kept in some of the most marginal and inhospitable agricultural areas of the world. There are three significant fibre products from goats, cashmere, mohair and hair. A fourth, cashgora, is a hybrid type, with intermediate characteristics between cashmere and mohair. Angora goats, being influenced both in mohair quality and yield by nutrition are better suited to more stable environments, which do not experience dramatic fluctuations in food availability. Cashmere growth, on the other hand, is remarkably insensitive to nutritional influence, and may be successfully produced in harsh, continental climates. Goat hair is used, particularly in arid areas, for the manufacture of coarse cloth, tent fabric and rope. Goats are able to utilise vegetation dominated by woody species, such as brush range or veld, which may be unpalatable to other grazing livestock. Their diet selection behaviour, when present at an appropriate stocking rate, can be used to achieve vegetation management objectives, eg sustainable brush or veld management, weed control or pasture improvement. Cashmere goats are produced primarily in highly extensive systems and by subsistence level pastoralists and nomads. The major producing countries are China, Mongolia, Iran and Afghanistan. Systems have been developed since

1970 for cashmere production in Australia, New Zealand, UK and U.S.A. which together represent some 9% of total world production. Primary producers of mohair are South Africa, U.S.A., Turkey, Lesotho and Argentina. Smaller numbers of mohair goats are kept in Australia, New Zealand, France, the C.I.S., Denmark, Spain and the UK.

INTRODUCTION

The goat fleece contains two types of fibre, derived from primary and secondary hair follicles. In most breeds of goat, there is a high proportion of coarse fibres ($>30\text{ }\mu\text{m}$) derived from primary hair follicles, together with variable proportions of finer undercoat fibres ($12\text{--}25\text{ }\mu\text{m}$) produced by the surrounding secondary follicles. These breeds are said to be double-coated. Certain of the hardier breeds of goat produce a high proportion of this undercoat (around 30-50% by weight) with a mean diameter less than $18.5\text{ }\mu\text{m}$, which can be harvested, either by combing or shearing and separated as cashmere down from the coarse guard hair. Goats that have been selected for cashmere production grow typically between 100-350 g of down per head per year - one of the most luxurious, and valuable of all animal fibres.

The Angora goat produces a high proportion of its fleece ($>90\%$) from secondary hair follicles. This fibre, mohair, is coarser ($20\text{--}40\text{ }\mu\text{m}$) than cashmere, and differs in many important quality characteristics. Mohair is lustrous, and the fibres have a wave, rather than the crimp of cashmere. Angora goats typically produce 3-4 kg fibre per year, harvested every six months by shearing.

Several crossbreeding programmes, aiming either to increase the yield of cashmere goats, or to reduce the fibre diameter of mohair, have produced the intermediate fibre, cashgora. This fibre, though of high quality, has proved difficult to establish in the market at a high enough price to justify the cost of dehairing. Popularity of cashgora with industrial buyers tends, however, to be closely linked with the price of cashmere, and, with the recent rise in the price of cashmere, cashgora is once more finding favour with the textile industry. Mohair characteristics are extremely undesirable in cashmere breeding programmes, such as were undertaken in the former USSR (Musalaev 1987) and in Australasia during the early 1980s (Couchman 1984).

An important physiological difference between cashmere and mohair production lies in the response of fibre growth to changing levels of nutrition. The yield and diameter of cashmere is highly unresponsive to changing nutritional status (Russel 1995; Johnson *et al.* 1984). Angora goats, on the other hand, like sheep, respond both in rate of growth and fibre diameter, to changing levels of nutrition (Brown *et al.* 1988). There is a positive relationship between level of nutrition and fibre diameter in Angora goats, and periods of undernutrition can result in breaks in the fibre leading to premature shedding and losses in yield and quality. The lack of response to nutrition of fibre quality or yield in cashmere goats enables cash-

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mere to be produced in extreme and fluctuating conditions. Mohair may be produced from low-productive infertile environments, but seasonal variation in forage availability must be kept to a minimum and compensated for by supplementation, if high mohair quality is to be maintained.

The industrial demand for mohair is vicissitudinous, with cyclic variations in fashionability and hence price. World production is still high relative to demand, which has resulted in difficult trading conditions and poor profitability for producers. In contrast, there is a stable market for quality cashmere garments, but the price of the raw material also is subject to large fluctuations, caused primarily by variations in the availability of cashmere from China (Table 1).

GOATS IN MARGINAL PASTORAL ECOSYSTEMS

The main areas where fibre goats are found tend to have low-productive semi-natural vegetation. The majority of the world's goat fibres are grown as a cash crop of peasant farmers in isolated communities, whose access to markets for fresh animal products is restricted, such as in Mongolia (Zagdsuren *et al.* 1994), Turkey (Yalcin *et al.* 1983), Afghanistan and Argentina (Somlo and Manazza 1993). Fibre is typically just one of a range of products derived from the goats. The other products, such as milk, meat and hides tend to be for local use. Goats are also well-adapted to grazing sparse pastures and may associate well with other livestock species in mixed grazing systems (McGregor 1988a). They are also useful for the sustainable management of certain arid vegetation types. Angora goats, for example, are the preferred livestock species for utilizing bush and shrub veld in South Africa (Van der Westhuysen *et al.* 1985). Research

demonstrated that under ten years of continuous grazing with Angora goats, the veld showed no deterioration, but instead, the number of perennial plants doubled. Sheep, under comparable conditions, caused a decrease by about one half in the palatable karoo bushes which resulted in a considerable increase in pioneer grasses. On this type of vegetation, Angoras have much less harmful influence on the vegetation at ground level, and can consequently utilise veld more intensively and completely, over a longer period of time than can sheep. This beneficial effect is, of course, linked to stocking rate. Overstocking can quickly lead to a sharp reduction in woody vegetation and a deterioration in environmental quality. Such vegetation reductions are not always undesired, and high stocking rates of goats can be effectively used for bush clearance, when this is the objective.

In Turkey, Angora goats are distributed mostly on the infertile Anatolian Plateau. This has a typical Mediterranean *maquis* vegetation dominated by *Quercus coccifera*, *Q. pedunculata*, *Q. cerris* and *Q. infectoria* (Tuncel and Rehber 1995). This region is semi-arid, with a dry hot summer and cold winter. Though often blamed for causing damage to the forests in which they graze, the goats play an important role in reducing ground level vegetation and the risk of fire, which is the more potent threat.

In the U.S.A., some 90% of the Angora goats are kept on the Edwards Plateau area of Texas (Craddock 1991), where they derive a large proportion of their intake from browsing dryland shrubs, such as live oak and *guajillo*. As in South Africa, the goats are valued for rangeland management, though in Texas, a primary objective of goat grazing is to reduce the density of brush vegetation to promote grass

and leguminous forage growth for cattle rearing. The goats are utilising resources not directly in competition with sheep and cattle, but modifying the vegetation to the benefit of the other species. In areas of the U.S.A. where leafy spurge (*Euphorbia*), which is poisonous to many grazing species, is abundant, goats have been found actively to select, and effectively control this, as well as other undesirable species, such as multiflora rose and red cedar.

Extensive work has been carried out in New Zealand on the use of goats for controlling gorse (*Ulex europeae*). Trials to assess the relative costs of "burn-and-spray" with three goat grazing systems (Krause 1984) found that all three goat systems offered more economic control than the chemical option. At that time, the most promising of the goat systems was cashgora production from feral x Angora wethers.

The aptitude of goats for weed control led, in the early 1980s to the experimental introduction of cashmere goat systems to Scotland (Bishop and Russell 1994). On upland swards, (*Agrostis/Festuca*) the effectiveness of goats to control invasions of rushes (*Juncus effusus*) was investigated. For pastures infested with rushes at 10% ground cover, mob stocking at densities of 78 goats/ha for 30 days per year were found to be the most effective treatment for eradicating the rushes (Merchant 1995). Trials (del Poso and Wright 1995) also demonstrated the positive effect that goat grazing has on the proportion of clover (*Trifolium spp.*) in sown swards. Weaned lambs grazing swards previously grazed by goats had higher percentages of clover in their diet, higher herbage intakes and gained 40g liveweight/day more than lambs kept on swards grazed previously by sheep.

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The numbers of grazing ruminants in isolated areas of Europe have decreased significantly in the past 20 years, as a result of rural depopulation, resulting in a build up of the vegetation biomass. This has had a number of effects. Increased shrub cover has led to a decrease in habitat variability and possibly wildlife diversity. It has also greatly increased its vulnerability to brush fires, which pose an ever increasing threat to property in Mediterranean countries. There is a great need throughout Europe, both for alternative livestock enterprises, and for new effective systems for vegetation management in marginal rural areas. There are currently several examples of serious attempts, all over Europe to develop goat fibre systems, both cashmere and mohair, to utilise these neglected resources.

FIBRE PRODUCTION

Cashmere

The industry regards cashmere as goat fibre with a mean diameter of less than 18.5 μm (Hopkins 1993). The fibres should have a low lustre and be crimped. The industry standard is Chinese white, which accounts for some 50% of all cashmere produced in the world and is the yardstick against which cashmeres from all other origins are judged. Systems for cashmere production in China are described in detail in Ma Ning (1996, see article page 13, September 1997 issue) and will not be considered further.

Cashmere down grows during a period between the summer and winter solstices, and is naturally moulted in spring. Harvesting is performed either by shearing or combing.

The key physical parameters governing returns from cashmere goats are annual down production

and kidding rate. The value of the fibre is related primarily to fibre diameter, and influenced by secondary characteristics, such as (low) lustre, colour and yield (proportion of down fibres in total fleece). The principal non-genetic factors influencing the quantity and quality of fibre grown are flock age structure, nutrition, physiological status, disease and shearing regime (Bigham *et al.* 1993). The viability of the system is, of course, highly dependent on the economic environment in which it is operating. It should also be stressed that fibre is often just one of a range of products (meat, milk, vegetation management) which together determine the system's ultimate viability.

Down production: The rate of fibre extension, the length of the growing season, the density of secondary follicles, and the fibre diameter each play a role in determining the economically important, "annual down production". These factors are clearly related. Most significant for genetic improvement schemes has been the marked positive relationship between fibre diameter and annual down production. This means that improvements in the value of fibre produced by breeding for finer fibre tend to be offset by an accompanying reduction in down fibre production (Bishop 1994a). This effect is, in part, to be expected as finer fibres are, by definition, lighter than coarser fibres. Given a static follicle density, it may be assumed that fibre diameter would have a simple square relationship with cashmere weight. Preliminary investigations in Scotland (Russell, A.J.F. pers.comm.) indicate, however, that the observed relationship between fibre diameter and down production is related to a power of 2.7. This strongly suggests that there is an additional factor, such as impaired rate of fibre extension, that is associated with decreasing fibre diameter. This conclusion is supported by reports (e.g. Bishop and Wray 1993) of a strong

correlation between fibre diameter and fibre length, though the nature of this depression of growth rate has not yet been convincingly established.

The rate of down fibre extension has been demonstrated in a number of studies (e.g. Ash and Norton 1984, Norton *et al.* 1990, Russell 1995) to be unresponsive to nutrient supply, at least in animals fed enough to cover maintenance requirements. In all studies, however, guard hair weight has been positively influenced by increased level of nutrition. McGregor (1988b) suggested that, in energy-deprived goats which lost weight, compensating for the reduced supply, nutrients are preferentially diverted to cashmere growth, while goats fed *ad libitum* partitioned nutrients towards hair growth. This explanation is in dispute (Russell 1995), and an alternative explanation could lie in differences between the follicle types in their metabolism of substrate. Protein supplementation, likewise, has little effect on cashmere down characteristics. In the same experiment, McGregor observed that sheep fed 27 or 54 g/day formaldehyde-treated casein produced some 40% more wool growth, but this level of supplementation caused no increase in cashmere nor affected hair growth.

Fibre diameter: Sub-maintenance levels of nutrition, as are commonly experienced in certain parts of the world, such as Australia, during the cashmere growing season, have been found to cause a reduction in down fibre diameter (and growth rate) in high-producing strains of cashmere goats (McGregor 1988b). Restall (1994) found that both high and low-producing strains produced finer fibre in response to nutrition and also demonstrated that high levels of nutrition did not effect a corresponding coarsening of the down. Though these trials

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indicate that environmental effects do play a role in the determination of cashmere fibre diameter, the main factor governing cashmere quality is genotype. There is general agreement that fibre diameter is highly heritable. Estimates of the heritability of fibre diameter include: 0.51 (Bishop 1994a); 0.99 (Bigham *et al.* 1993); and 0.61 (Pattie and Restall 1989), indicating a good opportunity for progress in selective breeding programmes.

In all the established production areas, the strains of goat used are derived from locally indigenous wild or feral goats. Wild goats tend to carry fine fibre, but at low yields. In Scotland, local feral goats were used as the basis for a planned breed improvement programme that was initiated in the early 1980s. These goats were found to have cashmere in the region 13-14µm mean diameter, but produced less than 80g/year. Captured feral males were initially mated with dairy breeds, such as the Toggenburg, but though this cross was found to be hardy and relatively prolific, it offered little improvement in terms of cashmere yield. To speed up the rate of genetic progress, importations were made in 1986-1988 of cashmere-bearing goats from Iceland (high quality fleece characteristics), Tasmanian (white fibre), New Zealand (white fibre) and Siberia (high productivity). The analysis of the results of crossings between these importations and the indigenous feral goats was made by Bishop (1994b). In this study, quality and quantity of 5-month kid fibre were combined into a single factor, Cashmere Production Index, which was weighted to take into account the relative financial rewards of an increase in yield and a decrease in fibre diameter. The strains were found to be ranked, indicating the high-yielding Siberian genetics to

offer the most profitable combination of fibre traits. It was also noted, however, that this strain was more markedly affected by age-related coarsening of fibre than the other genotypes, so that the fibre from adults often became too coarse to be considered as cashmere. Differences between strains were found to be no greater than differences within strains. The genetic improvement programme, therefore, has applied selection criteria to all goats, regardless of origin, in an attempt to combine the useful qualities of each.

At the production system level, improvements in fibre fineness are greatly assisted by a coordinated approach to buck selection, based on widespread use of objective fibre measurement technologies, and an effective mechanism for disseminating superior genetic material throughout the national herds. In practice, the necessary measurement technologies have been too expensive for most commercial breeders to use as routine. New developments in analysis methods, using both OFDA (Herrmann and Wortmann 1995), and cross-section analysis (Rasmussen 1995, Allain 1995) should enable the cost of fibre analysis to be brought down to commercially acceptable levels, and greatly enhance the objectivity of selection decisions.

Crimp and lustre: The feel and look of a finished cashmere cloth is influenced strongly by the degree of crimp (style) and lustre of the fibre. Chinese cashmere has a low lustre and relatively tight crimp, and it is generally these characteristics that are most sought-after by manufacturers. Fibre within the diameter range of cashmere, but that has a lustrous appearance or a loose, wavy crimp is unlikely to be accepted as cashmere or suffer a price penalty. In practice, this limits the use of animals carrying Angora genetics which, though tending to have a higher yield, such

as certain of the Russian breeds eg. Don and Altai Mountain (Siberian) goats (500-650 g and 450-600 g cashmere down/year, respectively) (Dauletbaev 1985), are not, in general, favoured by the industry. Failure to meet the quality demands in this respect caused the failure in 1992 and 1993 of contracts to sell the entire Australian cashmere clip, some 36 t in 1991, to the single international buyer. Angora genetics is also responsible for another unwanted fleece characteristic, intermediate fibres.

Intermediate fibres: The industrial dehairing process for raw cashmere requires for there to be a strong enough distinction between the down fibres and the coarse hair. The distribution of the down fibre diameter should be as narrow as possible, ideally with a coefficient of variation (CV) less, than 20%. In certain fleeces, notably those influenced by Angora genes, there is a broader spread of down fibre diameter values, obscuring the distinction between down and guard hairs. These so-called intermediate fibres are virtually impossible to remove and greatly devalue the fleece. As a general rule, the mean guard hair diameter should be four times the mean down fibre diameter to facilitate dehairing.

Harvesting: Harvesting may either be performed by shearing, with standard sheep shears, before the onset of moult, or by combing, between one and three times, with a metal-toothed comb during the course of the moult. Shearing is fast (2 minutes per goat), and a familiar exercise on sheep farms compared to combing (10-20 minutes per goat). Shearing must, however, be undertaken in late winter/early spring, when the climate in many parts of the world is too inclement for the shorn goats to survive outside. They must, therefore, be housed for a period following

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shearing. An additional disadvantage is that the shorn fleece naturally has a much higher proportion of guard hair than the combed. This reduces the efficiency of the industrial dehairing process, though, in practice, this effect is compensated to a certain extent by the greater efficiency of collection of cashmere fibres compared with combing. Shearing cashmere goats requires great skill on the part of the operator, particularly to avoid contaminating the fleece with short snippets of fibre, "double cuts", which, if they find their way into a finished garment, will cause "pilling" of the fabric.

There has been considerable research effort, both in Australasia and the UK to identify the underlying biological mechanisms controlling the time of fibre shedding. If the natural moult could be delayed by 2-3 months, the fleeces could then be shorn without the need for housing. There is also the possibility that, by extending the growing season, cashmere production could be increased. For systems developed with combing as the principal harvest method, the key requirement is that the flock should be well-synchronised, and moult together over a concentrated period of time.

The moult is triggered by the spring rise in plasma prolactin concentration, a change which is itself mediated by the flux of melatonin, responding to increasing day length. It has been suggested that melatonin implants, which mimic the effects of short daylength, could be used to modify the annual cycle of fibre growth in cashmere goats by extending the cashmere growing season and/or delaying the moult. The efficacy of melatonin is highly dependent on the date of administration, and the results of trials have been varied. Trials in Scotland

Dicks 1995), found that continuous release melatonin implants during the winter months actually caused an advance of the spring moult in adult goats, and in an earlier initiation of the growth of both guard hair and cashmere in the next coat, as judged by histological examination of primary and secondary hair follicles. This effect is attributed to a refractory response following overexposure to exogenous melatonin. In Australia, however, melatonin treatment in the spring has been shown to stimulate summer growth of cashmere, increasing total mean cashmere staple length by up to 65% (Welch *et al.* 1990). The onset of growth of the autumn fleece in the treated goats was delayed, as also was the time when maximum length was achieved and shedding occurred. Litherland *et al.* (1990), in New Zealand also found that there were favourable changes induced by melatonin implants. Treatments before the summer solstice increased cashmere production by 32%, though positive effects were not recorded in response to any other day of administration. Mitchell (1991) recorded no significant increase in total cashmere production nor any detectable delay in shedding of cashmere in response to monthly implants. Kloten and Norton (1995), however, conclude that melatonin implants at strategic times of the year may be a practical method for increasing cashmere production from young goats. To date, the technique remains a research tool and has not achieved practical application.

Kidding rate: The relative values of high kidding rate and superior fleece traits vary throughout the cashmere producing regions of the world depending on the market for goat meat. The factors influencing reproductive performance in cashmere goats are the same as for all breeds and will not be dealt with in detail. Kidding rate is influenced by genotype, and also by nutritional

status. Various values for the proportion of live kids born per doe mated have been reported: Russian cashmere, 93-107% (Karibaev *et al.* 1989); Australian cashmere, 106-139% (Gherardi and Johnson 1990); Chinese Liaoning, 110 - 120% (Jiang and Zhang 1993). In areas where cashmere goats normally receive a higher level of nutrition, reproductive rates tend to be higher. e.g. Scottish cashmere, 130-180% (SAC 1993), and North American cashmere, 140% (Craddock 1991), though nutrition is not necessarily the main factor depressing kidding rates in the other areas.

The development of cashmere goats in North America has been closely linked with meat production, for which both kidding rate and kid liveweight gain are important. The base stock, from which cashmere lines have been selected has primarily been the Spanish goat, which is widespread in the south, and for which there is a sizeable meat market. Cashmere is the additional product of a dual-purpose animal. This versatility is a marked feature of cashmere goats in the major producing countries, in which the main use of the animals is to provide milk and meat for the farmer and his/her family. The cashmere provides an annual cash income. There is increasing interest in all parts of the world in multi-purpose goats (Horst 1996). Cashmere, or cashgora may be introduced to meat/milk goats in developing countries, without a penalty in productivity, to provide an extra source of income. This is the subject of a current research programme in Bolivia, which aims to produce cashgora from local *Criollo* goats for use in traditional weaving. Similarly, there has been widespread interest in the use of South African Boer goats to improve the carcass traits of cashmere goat kids in New Zealand

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(Couchman 1988).

Marketing: The requirement for cashmere to be dehaired—an expensive industrial process, requiring large volumes of fibre to be cost-effective—makes it a necessity that fibre is pooled centrally in the producer countries. Private sales and the use of the fibre in local handicrafts is restricted. In the major producing countries, collection and marketing is administered by various organs of the state. In the other countries in which cashmere is less well-established, the need for infrastructure has encouraged cooperative organisation between farmers. This has extended to breed-improvement schemes (performance recording, buck testing etc.) and even to contract processing and marketing of finished products. The prices paid to farmers in this latter group tends to be based on the current international prices.

Mohair

The Angora goat was first brought to the Ankara region of Turkey in the 13th century by the Ottoman Turks. The breed developed there and the region became famous for its fine, handwoven cloth. This trade persisted until the Industrial Revolution in the UK wiped out the export trade in yarn in 1839. In subsequent years, mohair was exported as raw material to the mills of Britain.

The Angora goat is the most efficient of all small ruminants at converting food to fibre, producing up to 0.55 g fibre/10 Kcal digestible energy intake (Shelton 1984). Fibre growth is continuous throughout the year and the mohair must be harvested by shearing at 6 month intervals. This characteristic obliges mohair producers to provide, at least once per year, appropriate shelter or housing following shearing, as the animals are highly

sensitive to exposure at this time. Shearing dates are selected on the basis of kidding and mating seasons, to avoid overstressing heavily pregnant animals. Heavy growth of fibre at kidding must also be avoided at this causes problems of suckling for the neonate.

In comparison with cashmere goats, the Angora is a specialist fibre-producing animal. Typically, some 85% of income in Angora enterprises are derived from mohair sales (Allain 1993). As in cashmere goats, the key production traits are fibre quality and quantity and mean fibre diameter, lustre (high) kidding percentage and liveweight. The additional factor, number of medullated and kemp fibres must be added to this list, as these hollow fibres affect uptake of dyes, and their presence is undesirable.

Fleece weight is dependent on size and sex, with bucks producing more (3-5.5 kg/shearing) than does (2-2.5 kg/shearing); age, increasing to a maximum at 3-4 years; and reproductive status, with growth rate depressed during pregnancy. Mohair quality is assessed on the basis of length, style and character, kemp and medullated fibres, and fibre diameter.

The length of the fibre within the staple will determine the appropriate method of processing. Rate of fibre extension is commonly in the region of 25 mm/month, representing fibre lengths at shearing in the range 75-150 mm (Van der Westhuysen *et al.* 1985). Style and character describe the amount of twist and wave in a staple, which contribute to the feel of the finished garments. The single most important factor is fibre diameter, and mohair is classed typically into 3 fineness classes - kid (<29 µm), young goat (30-34 µm), and adult (>35 µm, and within which three subcategories are distinguished) Presentation of the shorn fleece is also an important component of

quality, and particular care must be given to reduce contamination, in particular with seeds and other vegetable matter, and polypropylene twine.

Fibre growth, as in sheep, is responsive to nutrition in the Angora, and it is important to maintain adequate levels of nutrition, using supplementary feeding if necessary to maintain fibre growth rate and quality. Reproductive performance, too, is affected by nutritional status. Angoras are notable for poor kidding rates and indeed for low kid growth rates. In South Africa, kidding rate is reported as approximately 92% (Wentzel 1993). In Texas, kidding rates average 50-60%.

The poor reproductive performance and growth rates are closely linked to the breed's extraordinary capacity for fibre production. It has been known for over 20 years that energy deficiency is the primary trigger for most abortions in Angora does (Wentzel 1993). In South Africa, widespread use is made of energy supplementation for the pregnant doe and this has achieved significant reductions in the rate of abortions. It has become increasingly apparent that energy supplementation is the key to improving performance with respect also to conception rates, and kid survival. Provision of alkali-ionophore-treated whole maize protects maiden does from cold stress by restoring circulating glucose to normal levels. Cronjé (1995) studied glucose metabolism in low- and high-producing strains of Angora goats. The high-producing phenotype was characterised by an inability to mobilise glucose precursors (gluconeogenesis) during periods of increased demand. As a result of selection for fibre traits, there has been a shift in the partitioning of glucose precursors (e.g. certain amino acids) to hair protein synthesis which has resulted

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in an inability to cope with peak demands for energy.

In the sub-optimum environments in which Angoras are normally found, the improvement of reproductive performance will largely depend on the cost-effectiveness of appropriate supplementary feeding.

In more productive environments, in which energy intake is unlikely to be a limiting factor, the output from mohair sales is unlikely to be competitive with the alternative livestock species that are able to use these better resources. This is the case in Europe, where there has been considerable interest in mohair production in the last 15 years, notably in France, Denmark, the UK and Spain. It is, however, impossible in Europe to produce mohair for less than the current international price. This situation has obliged European producers to cooperate and innovate to develop high value niche markets. In France, mohair is sold under the label, *Mohair des fermes de France*. The farmer's cooperative is responsible for maintaining the herd book, performance recording, and developing selection criteria, as well as fleece collection and grading, and finally product design, processing and promotion. The finished products, which include woven and knitted garments and kits for hand-knitting, are returned to the farmer, in proportion to the amount and quality of raw fleeces supplied, for retail locally or in farm shops (Moreau 1996). Vertical integration of the production system and the development of high-value niche markets has created the opportunity for farmers to achieve a value for their mohair well in excess of the international price—the prerequisite for a viable small industry to develop.

CONCLUSIONS

The major factors influencing goat fibre production systems have been briefly examined. The bulk of fibre goats live in barren, isolated areas, where the value of fibre as an agricultural product lies in its ability to be stored, and the facility by which it may be transported to market. It is possible to produce quality goat fibre under environmental conditions which place severe restrictions on other forms of agricultural production. Fibre goats may be closely integrated in the wider agricultural ecology of a region. The goats themselves are used for meat and skins locally, with fibre providing a cash income. In addition, the grazing behavior of the goats make them effective managers of vegetation, complementing the production systems for other livestock species.

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Table 1. Major world producers of goat fibre.**Annual production volumes (tons) of cashmere and mohair in 1991**

		<u>1991 Production</u>	<u>World total</u>
Cashmere (Dehaired)	China	3,000	
	Mongolia	1,500	
	Iran, Afganistan	1,500	
	Australia, NZ, India	500	5,500
Mohair	South Africa	7,500	
	USA	6,800	
	Turkey	1,200	
	Argentina	600	
	Australia	600	
	Lesotho	500	
	New Zealand	300	17,500

Old Laws to Live By

Husker's Law: If there are two events of equal importance, they will always conflict.

Dave's Law: If you can't be fair, be arbitrary.

Mickey's Law: No one is completely worthless; they can always be used as a bad example.

Mittens' Law: When everything is perfectly clear to everyone, somebody didn't get the message.

Bart's Law: Tradition is yesterday.

Goat People—Christy Proost

By Christy Proost
Snowy River Farm

Snowy River Farm, Mechanicsville, Virginia, just outside of Richmond, is home to 30 beautiful goats, some Cashmeres, a few pygmies, some Nubian wethers (for noise), two sheep and a donkey named Charlie (my husband wanted a CD player for Christmas, so I gave him Charlie Donkey, CD, get it?).

Our first goat, Jenny came to Virginia with us from St. Louis, Missouri in the back seat of our car, license plate "BAAHHH." I'm sure there are still folks who remember passing "that car with a goat in it" on Interstate 64. Believe it or not, Jenny is housebroken and not a single "berry" has ever hit the floor in our house or the back of the car, even during a 950 mile trip! Jenny is now 13 years old and still going strong—two years ago her fleece was a blue ribbon winner at the NWCA competition.

At Snowy River Farm we have 21 acres and eleven stalls in three barns. All of the goats are put into stalls at night—I sleep better that way. They are assigned stall-mates according to their personalities; the M's (mean) are separate from the M&M's (meek and mild). Dirty Harry is housed alone and there are no letters to describe him! All of our goats have names and there is a story for each—such as when Dusty had twins. If the kids had been girls, they would have been named Dolly and Daisy, but alas, when I picked up the first born and saw the equipment, I said "Darn it"; the twin had the same equipment and I said "Dammit", so you know the names of those two!

I served on the Eastern Cashmere Association Board of Directors for two years. Right now my whole house smells like a barn due to the mountain of cashmere that I have received for the State Fair Virginia / ECA fleece competition. There are some beautiful fleeces entered and I am anxious to see the animals that will be shown at the Fair.

Snowy River Farm is my country club. I don't go to aerobics classes, I load hay and feed instead. I don't play bridge with the girls, I trim hooves instead. I'm not on a tennis team, but I can put up a half mile of fencing in a day and a half. I am an avid reader—of veterinary manuals. My days start and end with my goats' wonderful brown eyes looking at me saying, "I love you." As you can tell, I am strictly a hobby goat person. I wish the commercial market was a roaring success because that is why I originally got into cashmere, but since it is still struggling, I am content to have my goats for friends, not profit.

Round Hay Feeder: I made a round bale feeder for our 30 cashmeres by putting together four 6' gates. The gates cost \$30 each, are 48" high, made of five tubular steel bars with 9" spacing. Even the big bucks can get their heads in and out. Cover with a tarp. The whole rig can easily be moved around the pasture or feeding area. Our fuzzies go through 75+ square bales a month @ \$3.50. A round bale lasts two weeks and costs \$25.00 delivered. Round is good!

Winter's coming! Do you know what you get when you make a snowman in a goat pasture?—A snowman with LOTS of buttons! If you don't get it, try making a snowman in a goat pasture and you'll understand instantly!

K R
A I
R B
M B
A O
' N
S S



Karma
(and her ribbons!)

For fleece:

1995 - At NWCA competition, Karma won her class and the Jr. Championship

1996 - At NW competition, she won the 1994 Combed doe class and the Purple Jr. Champion rosette.

For the animal:

1996 - ECA First Place ribbon and Reserve Grand Champion rosette.



Christy's "Karma"

Fencing Options For Goats

From the U.S. Extension Goat Handbook

There are many different types of fencing at a great variance in initial cost. The selection of a specific type for a certain size or sex of dairy goat, can be very important. For large pasture areas in which the mature milking herd resides, the less expensive 48" high sheep and cattle fencing may suffice.

Stock Panels. Another very durable fence in areas of high stress or to confine strong bucks is the stock (or hog) panels. They come in 52 inch heights, 16 feet long, with the horizontal stay rods 3 inches apart at the top. The vertical rods are 6 inches apart. These panels are more costly but they will outlast all fencing.

Picket Fence. There are other types of fencing on the market. The following may be less suitable: The single or double picket lawn fence is a heavy-duty fence that withstands weather (rusting out, etc.) for a greater number of years than the sheep and cattle fence; but the stay wires on it are not as tight and goats soon learn that they can play with the fence and get it to slip, eventually making holes in it that they can simply walk through.

Snow Fence. The wooden picket (snow) fence, although probably the cheapest in cost, should not be used unless for a temporary situation. Dairy goats eat right through it in a matter of a few months.

Welded Fence. The one-inch by two-inch spot-welded fence has a tendency to loosen at the spot welds quite fast and therefore is not recommended.

Electric Fence. The electric fence with the use of one or more strands of electrified wire has been used successfully by some dairy goat breeders, but each animal must be introduced to the shock. Although this fencing may work to confine the introduced dairy goats, protection against stray predators and dogs may be minimal. Fencing serves two purposes, first, to keep dairy goats where you want them and, second, to protect them from predators.

Four strands of electric fence, the second from the bottom preferable being a barbed wire, seems most effective. The bottom wire should be about six inches off the ground, just high enough to clear the power lawn mower under the fence. Tall grasses must be cut to prevent shortening-out of the electric fence. An average charge unit is usually best, but it must be well grounded in moist ground six to eight feet deep.

Barbed wire. Barbed wire can be used as goat fence if many strands not too far apart (6-10 inches) are used, very tightly strung on 6 feet high posts. However, if there is attractive pasture on the other side of the fence and the goats, especially kids, are hungry, then they will squeeze through, especially

under the bottom wire.

Turkey Wire. Just plain turkey wire makes good fence but again it must be tight and the posts no more than 10 feet apart.

The best fence from an animal behavior standpoint can be found e.g. at Laurelwood Acres in California. It consists of vertical pipes with horizontal and bottom pipes, posts and bottom edge in concrete. Certainly not cheap but very effective for dry-lot operations, long lasting, easy to maintain, and easy to run the herd back and forth to the milking parlor. In the absence of horizontal strands, goats have nothing to climb on.

Bracing. When installing fencing, it is necessary to brace the corner posts either by wires to stays on the outside or by posts placed diagonally on the inside, or embedding the corner post in enough concrete to keep it from moving as the result of the tension of the wire.

Gates. Gates can be varied in size. Large aluminum or steel gates are good to use in areas where a vehicle such as a truck or tractor needs to pass through. Smaller gates can be chainlink or woven wire. In areas where there is snow in the winter, those smaller gates should be raised off the ground almost a foot to insure use while snow is on the ground.

Locking gates around goats, especially metal, can be a problem. The goats are intelligent and can figure out how to get out fast. The goats will push and work at a gate, trying to get out, if they can start the smallest of cracks. It is important that the gate be closed tightly and securely. Two successful locks are: a nylon snapline with a brass weather-resistant snap to fasten; the other is a nylon collar (goats will chew through leather collars) buckled tightly with the strap placed under the extra ring on the collar. By using these, the gate can be drawn tight preventing play that leads to caught heads. Kids, especially, like to get their heads caught. The properly fastened gate is double-fastened with the top one as high as you can put it.

Portable Fence. Lastly, there is a type of portable fencing that comes in handy when one needs a pen in a hurry—to isolate an animal or for a temporary gate, or as a separator inside the truck when hauling kids and bucks. This is a product sold by Sears and is available in sections 44 inches high by about 42 inches in width and is connected by rods so that one can make up whatever size pen is needed. The fencing is sold for use as portable pens for young children to play in and can be folded accordion style to store and also used as a separator or hay rack when going to a show.

Calendar of Events

Association Contacts

October 24, 1997

Mild Goat Men - First (maybe annual, maybe not) meeting. Bozeman, Montana, at a saloon to be announced. More information? Contact Head Herder, Johnson, 503-623-5194.

October 24-26, 1997

PCMA Business of Cashmere Conference III
Bozeman, Montana, Holiday Inn Convention Center
For information, contact PCMA at 406-683-5445, fax 406-683-5567.

November 1, 1997

Level One Judge Training class, 8:00 - 5:00 pm
Langston University, Oklahoma
Sponsored by the Oklahoma Meat Goat Association, the American Meat Goat Association and the Cooperative Extension Program at Langston University
For information contact Eddie and Helen Harrison at 405-867-4147

November 1-2, 1997

State Fair of Louisiana
Louisiana State Fairgrounds, Shreveport, LA. Contact for entry: LA State Fair Livestock Office, PO Box 38327, Shreveport, LA 71133
Phone 318-635-1361

November 8, 1997

Goat Management Workshop, Tulsa County Extension Office, Tulsa, Oklahoma
Offered by Tulsa County Office of Oklahoma State University's Cooperative Extension Service and the Langston University Cooperative Extension Service. Topics include goat types, breeds and economic impact in the US, nutrition and management of the meat goat, "Brush Busters" info, live animal health demonstration, basic diet balancing and making mozzarella goat cheese. Anyone interested in registering for the full-day Saturday workshop, contact Tulsa County Extension Office, 4116 East 15th Street, Tulsa, OK, phone 918-746-3705 Enrollment limited to first 90 participants, cost \$10 which includes lunch and printed materials. A good deal!

American Meat Goat Association

W. E. Banker, President, 512-384-2829

Cashmere America Co-operative

Joe David Ross, Manager, 915-387-6052
fax 915-387-2642

Wes Ackley (Maine) 207-336-2948

Marti Wall (Washington) 360-424-7935

Cashmere Producers of America (CaPrA)

Marilyn Ackley, President
Phone/fax 207-336-2948, ackley@megalink.net
CaPrA office: 512-452-5205, fax 512-452-5521

Colorado Cashmere and Angora Goat Association (CCAGA)

Carol Kromer, Club Contact, 719-347-2329

Eastern Cashmere Association (ECA)

Ray Repaske, President 540-436-3546

North West Cashmere Association (NWCA)

Cliff and Mickey Nielsen, 509-658-2502

Professional Cashmere Marketers' Association

(PCMA), Tom and Ann Dooling, 406-683-5445
knits-pioneer@worldnet.att.net

Texas Cashmere Association

Dr. Don Huss, President
915-396-2920 or 915-396-2195
tca@webstar.net

Western Prairie Cashmere Association

John Harris, President
308-635-1579
JHarris@Hannibal.WNCC.CC.NE.US

Wild Goat Women

Debbie Walstead, Chairperson
719-495-2962

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A.I.

Continued from page 11

the largest single expense, and will cost approximately \$500.

SEMEN THAWING AND INSEMINATION PROCEDURES

The first step is to restrain the doe to be inseminated. This can be done with a breeding stand or any other satisfactory facility.

After the doe is restrained, the semen is thawed and the insemination gun is prepared. Frozen semen should be thawed according to the processor's recommendations. If these recommendations are not available, remove the frozen straw from the liquid nitrogen tank with a straw tweezers, and place it in a thaw box filled with warm water (95°F) for 30 seconds. After thawing, dry the straw thoroughly with a paper towel. Semen must be kept warm and must not be exposed to sunlight or water during the thawing and inseminating process to prevent damaging or killing sperm cells. Pull the plunger back 4 to 6 inches on the insemination gun and place the straw into the gun with the cotton plug toward the plunger. After the straw has been secured in the gun, the sealed end of the straw must be cut off with the straw cutter. The cover sheath should now be placed over the insemination gun and secured with an O ring.

The next step is the actual insemination process. It may be necessary to lift the doe's hindquarters if she will not stand. If working alone, hold the insemination gun in your mouth, or have an assistant hand the insemination gun to you at the appropriate time. Turn your headlight on.

Lubricate the speculum with a non-spermicidal lubricant. Clean the doe's vulva with a dry paper towel and insert the lubricated speculum slowly into the vulva. Insert the speculum at an upward angle to prevent vaginal irritation.

Once the speculum has been inserted, visually locate the cervix. The cervix should have a red-purple color and white mucus will be present if the doe is in heat. Center the speculum over the opening of the cervix.

Insert the insemination gun into the speculum and thread it into the opening of the cervix. Use a circular motion and slight pressure to work the insemination gun through the rings of the cervix. Do not penetrate the cervix more than 1.5 inches. It is a good idea to draw a red ring around the cover sheath of the insemination gun 1-1/2 inches from the tip. This mark lets you to know how far you have penetrated the cervix.

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Classified Advertising

Cashmere's 1st Place Winners Oregon Flock & Fiber Festival, Sept. '97. Very nice fiber goats for sale. Bucks and does. Debbie 503-625-7836, Sherwood.

CashMirror back issues 7/96 - 6/97 \$3 each or a whole dozen for \$20. Back issues 10/89 - 6/96 \$2 each or \$15 for a dozen. We'll pay postage just to get them out of our attic. Most issues available. A good reference source about cashmere goats and history of the industry. Index for 7/96 - 6/97 in July 1997 issue. Index for 10/89 - 4/96 in May 1996 issue.

CashMirror extra issues for Breeders. Want some extra issues of CashMirror so you don't have to give yours away to those people you sell goats to who have a million questions? Duplicate copies of any back issues we have for current subscribers only \$2@, includes mailing.

Maremma Sheepdog Club of America, Maremma Livestock Guarding dogs, PO Box 546, Lake Odessa, MI 48849, 616-374-7209. Free information and Breeder Directory.

Wanted: your photos for 1998 CashMirror calendar. Photographs can be any size, in color or black and white. For each photo we use, we will give you a free calendar. Need before November 1, 1997. Good subjects: cashmere goats, people with their goats, guard or herding dogs. Call Linda or Paul if you have questions: 503-623-5194 or email at goatknol@teleport.com

Deposit the semen slowly by pushing the plunger forward. Remove the insemination gun slowly and remove the speculum.

Record all important information in a breeding journal.

Artificial insemination is a powerful tool that can allow dairy goat breeders the flexibility to increase the rate of genetic improvement in their herds. Although A.I. is a powerful tool, it requires proper technique and attention to detail for a high level of success. With good heat detection, records and semen handling techniques, individuals can become successful A.I. technicians.

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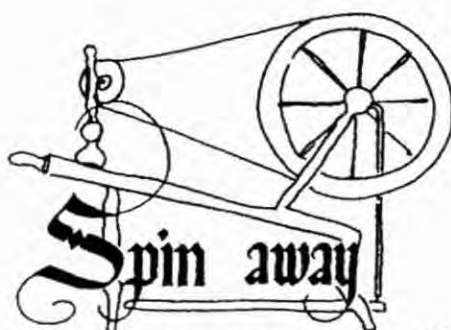
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