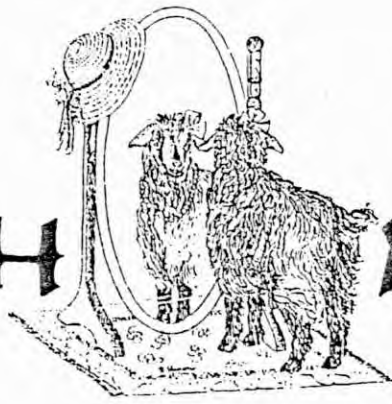


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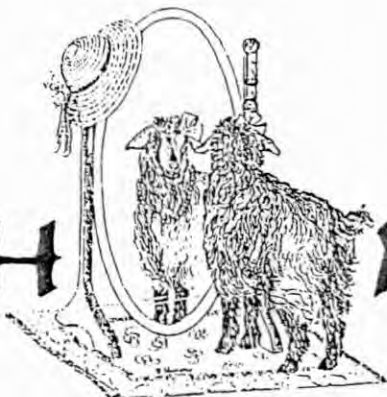


VOLUME ONE, ISSUE ELEVEN

AUGUST 1990



CASHMIRROR



CASHMIRROR REFLECTING THE CASHMERE INDUSTRY

CashMirror Publications, 200 Larson Road,
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Judith Richardson, Publisher
Wendy Paulin, Editor

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REFLECTIONS

It is with a great sigh of relief and satisfaction that the "Step in the right Direction" cashmere seminar is a thing of the past. A lot of work and preparation went into that seminar and it gave us a big thrill to have it so well attended and to have it go off without any major "glitches". We proved Murphy wrong this time. Even the weather cooperated allowing Friday evening reception to be held out on the deck above the mighty Columbia River. Like everyone else in attendance we soaked up great amounts of information from all of the speakers. Much of the information from Dr.s Barrie Restall and William Pattie has never been presented in the U.S.A. In fact, many Australians have not had the opportunity to hear of their latest research. We do feel blessed and those of us who attended the seminar can indeed feel we now have the tools to step in the right direction.

Wendy and I are thinking of repeating it next year. However, we are afraid our first act may be too tough to follow. We'll have to ponder this awhile before committing to a repeat.

Now Wendy and I need to concentrate on meeting CashMirror deadlines and getting ready for the big embryo transfer project involving 15 test farms across the country. The team will leave here Nov 1 and will finish up in Maine on or about Dec 15th allowing my husband and I to arrive home just before Christmas.

In between now and November 1, my husband and I will be spending time with Drs. Restall and Pattie on their home turf in Queensland and Northern New South Wales and viewing their research flocks and further research projects. If we have as much fun with those "blokes" as we did here, Duane and I are in for a real treat. We had the fun of having them in our home for 5 days and it was 5 days of pure joy. We also had the pleasure of Bron Scheutze and Jill Darrah in our home after the seminar. Needless to say, all the rumors we've heard about them are true. They are wonderful!

Cashmerely yours,

Judith

Judith Richardson Haralson



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A Newsletter discussing
Cashmere
and the U.S. Cashmere Industry

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COVER PHOTO: PMF Cashmere Co. Ann Dooling with a curious cashmere kid at their Montana farm. Photo courtesy of Yvonne Sweede.

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LETTERS

We welcome your comments - good, bad or indifferent - about the CashMirror, the industry, or goats in general. We will help your voice be heard. Please write.

Dear Judith,

The magazines came yesterday - I have been reading steadily. I find them filled with interesting and useful information. (Why has it taken me so long to find you?) I now know that the persons I have spoken with around the country were aware of you and the CASHMIRROR - so why hasn't someone told me about you sooner? - especially since I have been asking for other resources.

I can't tell you of my disappointment when the deal fell through with _____. I thought that my only opportunity to own quality cashmere goats at an affordable price was gone. He did attempt to "work a deal" for me but you'd never believe it all....! If everyone interested in cashmere goats goes through the same experience I have, then the industry is committing suicide.

K.E., Alabama

Dear CashMirror,

What a pleasure it was to meet you both and share time with you and the other goat people at the seminar. I had a great time, everything was done so well and I want to thank you again for the article on our breeding operation in CashMirror.

I look forward to some more good times as we progress toward a larger more exciting goat industry in the future.

Thanks again,

Don Jackman
American Breeders Cashmere Company
Camp Wood, Texas

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**CASHMIRROR
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CASHMERE DOWN UNDER

By Jenny Eddington
Selbourne Tasmania, Australia

After writing my segment last month Winter really arrived here and there was snow lower than there had been for 30 years. That was followed by rain for what seemed like weeks. I have scaled down my outside flock classing this year as I had planned to be in the U.S.A.. I did class a couple of flocks and one in particular I have been doing for several years. That breeder, who is running solely commercially, began with ferals 5 years ago and has bred up from there. It is amazing to see the improvement in the bred up stock. This year the originals and first cross does have been culled and the bales that went off to the pool where certainly an improvement on 5 years ago. I make mention of this because I think there are some of you beginning with Meat goats and thinking that you may never make headway as you shear low yielding fleeces. Believe me, with careful selection for those traits which are important, real progress can be made in very few generations.

Because we do all our own shearing we have been doing it for a couple of weeks in small groups. The weather has been so horrid that this gives us a chance to give very good shelter to the freshly shorn goats. However, this is not our normal practice. The goats are benefiting from the fact that due to illness we have been short handed. This means there has been less time for Tim to be available to shear. Our new addition, Aimee, has already been to shearing shed several times and loves it. She sits up in her pram and watches us, and then goes to sleep when she is bored.

A few early bird kids have arrived. They are a result of a buck escaping while being prepared for show. Bucks are usually not near the dams. Main kidding gets under way in around 3 weeks so we really hope the weather takes up. There are also 1,200 ewes to begin lambing any day now. I really love the arrival of the new additions and the anticipation of the results of mating decisions. It all coincides with the arrival of the wattle blossom (Mimosa) and the first spring flowers, and unfortunately the Spring rains.

I have been saving fleeces which look especially nice and will go through them at the end of shearing and try and select something for each class in the Western Australian fleece contest which is held in September. There are two parts to this contest. The first is judged

on the results of the A.W.T.A. fleece test and the winner is the fleece with the highest calculated yield based on the results of the test. The second part is judged visually by an experienced fleece classer without the benefit of the fleece test results. It will be interesting to see the results, and if man and machine agree.

Last week I had a fun day and went along to the Tasmanian segment of the World Conference of Corriedale breeders which was held at a friend's property which is very historic with beautiful gardens. The stud sheep were penned on the large expanse of lawn and the guests from around the world enjoyed some real Australian hospitality. The chairman of the U.S.A. breeders Association was there and many South Americans plus one person from the Falkland Islands. It was a great few hours sharing a common bond with so many diverse cultures. ◊

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THE EFFECT OF USING BUCKS WITH COARSE FIBER

By Dr. Barrie Restall and Dr. William Pattie

WE would like to comment on a point raised in the February 1990 issue of Cashmere Australia and explore the consequences of using bucks with coarse cashmere. In that article, it states the belief, which is not proven, that there is a "sire effect" on cashmere diameter. It contends that this results in brothers and sisters of the same genetic background having different diameters with males averaging 2 um stronger than females with a range of 1 to 3 um. On this basis, the article then presents calculations showing that the effect of using bucks with strong cashmere might be less than one would expect. There are problems with both the original premise and the calculations that have important implications for cashmere breeders.

THE DIAMETER OF CASHMERE FROM MALES AND FEMALES.

We have examined the fiber diameters of male and female progeny of all sires used in the Wollongbar herd. These involve records from 4984 offspring of 144 sires in a total of 315 sire/age/year groups in which there were at least 4 of each sex. The differences in diameter between the male and female half sibs in each group are shown in figure 1.

It is clear that there is no consistent difference over the whole of the cashmere range and there is no trend with age or average diameter in the male-female differences. In some year/age/sire groups, differences approaching 2um were observed, but there were as many favoring females as there were favoring males. In general, the larger differences occurred in subgroups with relatively small numbers. It is important to note that the progeny were unselected and that no special treatment was given to either sex.

To study this question from another perspective, we calculated estimated breeding value (EBV) for diameter of the second full fleece for all sires and dams in the herd using BLUP procedures. These calculations used information from the ancestors, relatives, individuals and progeny of the sires and dams. The results for those parents for which individual records were also available are given in table 1.

If there were a "sire effect" of 2um, we would expect the EBV for the 18.4 um sires to be similar to that of the 16.4 um dams. This was clearly not the case and in fact, within all diameter classes, the EBVs were similar for sires and dams.

There is obviously no "sire effect" for diameter in the Wollongbar herd which provides the largest data set for cashmere breeders. However this is not the only case as published results from studies in a commercial herd in

South Australia and the New Zealand sire reference scheme also show no difference in diameter between un-selected males and females.

It is our recommendation, therefore, that breeders should not assume any "sire effect" in diameter when selecting or buying bucks.

CALCULATING THE LIKELY EFFECT OF BUCKS WITH COARSE FIBER.

The effects of selection are calculated by averaging the estimated breeding values of the male and female parents. If we use an animal's own measurement, its EBV is simply calculated by multiplying the heritability by the deviation of the animal from the herd average for animals of the same age.

Reworking the calculations in the article with no "sire effect" and assuming the buck comes from the same herd as the 16 um does, the buck's EBV would be $0.4 \times (20 - 16) = +1.6$. With no selection among the does, their EBVs will be 0 so the average EBV of the parents will be +0.8 um and this will be the expected change in the progeny, not 0.4 um.

However, apart from the "sire effect", the article's calculations are based on two other assumptions that need to be examined. These relate to the heritability and the genetic level of the herd in which the buck is born.

Used in the article is an estimate of 0.4 for the heritability of diameter. The 4 estimates that have been published from NSW, Victoria, South Australia and New Zealand are 0.47, 0.68, 0.70 and 0.85 and our actual selection results gave a realized heritability of 0.58. Using the realized heritability from our herd of approximately 0.6 and with no "sire effect" the EBV for 20 um buck would be +2.4 giving an increase in his progeny of 1.2 um for an average of 17.2 um; considerably more than the first estimate.

article assume that the buck was born in the same herd as the does to which it would be mated. However, if bucks are obtained from another population it is necessary to consider separately the genetic level of the herd in which it was bred and the buck's EBV within that herd. There have been no studies in Australia on the genetic component of differences between herds in average diameter so at present it would be safest to assume that most or all of the difference is genetic. The first part of the following calculations can be modified for the other assumptions.

If the buck came from a herd with an average diameter of 18 um, its breeding value for use in a 16 um doe herd would consist of two parts: The genetic difference between herds (2um), plus the bucks's EBV within its own herd ($0.6 \times 2 = 1.2$). Thus the total breeding value of the buck for the 16 um herd would be +3.2 um. This would result in an increase of 1.6 um giving an average of 17.6 um in the progeny. This approach is the correct one for breeders purchasing bucks and illustrates the importance of knowing the herd average as well as the individual's own record for any production measurement. It should be easy for sellers to provide herd average diameters from the test results of lines within their total cashmere clip.

Clearly, large differences in expectations can arise when simplistic calculations are made that involve important assumptions. In the cases illustrated here, price differences of 2 diameter grades could be involved so care is needed and assumptions should be based on reliable evidence wherever possible.

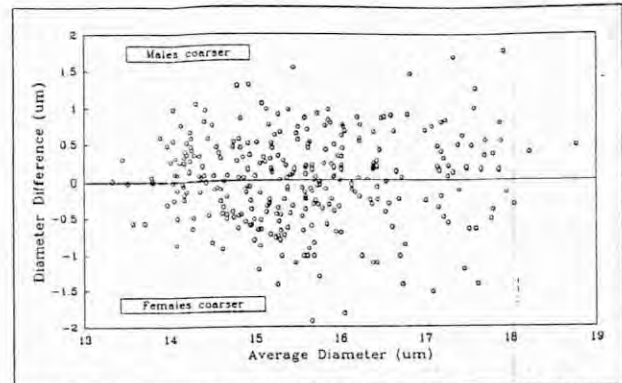


Figure 3. Differences in cashmere diameter between male and female half sibs. The points are (male-female) in microns.



Dr. Bill Pattie and Dr. Barry Restall. "The Step in the Right Direction" seminar. Vancouver, Wa.

Diameter Range (um)	SIRES		DAMS	
	Average Diameter	EBV	Average Diameter	EBV
<15.0	14.4	-0.82	14.4	-0.65
15.0-15.9	15.5	-0.27	15.4	-0.15
16.0-16.9	16.4	0.24	16.4	0.28
17.0-17.9	17.3	0.80	17.4	0.67
18.0 and above	18.4	1.38	18.5	1.20

Table 1. EBVs for diameter of the second full fleece (21 months) of sires and dams with a range of individual diameters.

TAKE THE KINDER PLUNGE!!!

Kinder goats have been welcomed with open arms nation wide, and we want to let you in on it! The Kinder Goat Breeders Association celebrated it's first birthday with the first ever Kinder goat show. Breeders all over the nation are joining the project in building Kinder herds. Now looking back, the rapidly growing Association is impressed with the quality of breeders choosing to take the Kinder plunge. It is exciting to see that the kinder goat has general appeal to all goat enthusiasts; large breed lovers as well as small goat advocates.

Why is this breed so attractive to such a wide audience? With productivity, temperament, meat potential, feed efficiency -- Who could ask for more? The exceptional qualities of the Kinder goat are appealing for many aspects, dairy and chevon. The doe can be expected to produce 6 pounds or better daily of good sweet milk with an average of 6 percent butterfat, each gallon weighing about 8.65 pounds. What a break for the pocket book to know that you can expect comparable milk production from near half the feed. As well as less feed, the small stature of the Kinder goat, standing 20" to 26" tall at maturity requires minimal housing. The medium size coupled with the gentle disposition of this breed make for easy overall handling. The soft pliable texture of the udder, complimented by the comfortable teat size makes the Kinder a pleasurable and practical dairy animal.

What seems to have captured the hearts of many is the adorable puppy-like appearance and kinder-like antics of the Kinder kid. With a dished face, long floppy ears, and large expressive eyes the Kinder kid sells itself. They tend to arrive in batches of two to five, requiring no more than 10 ounces of milk per kid, three times a day at their peak.

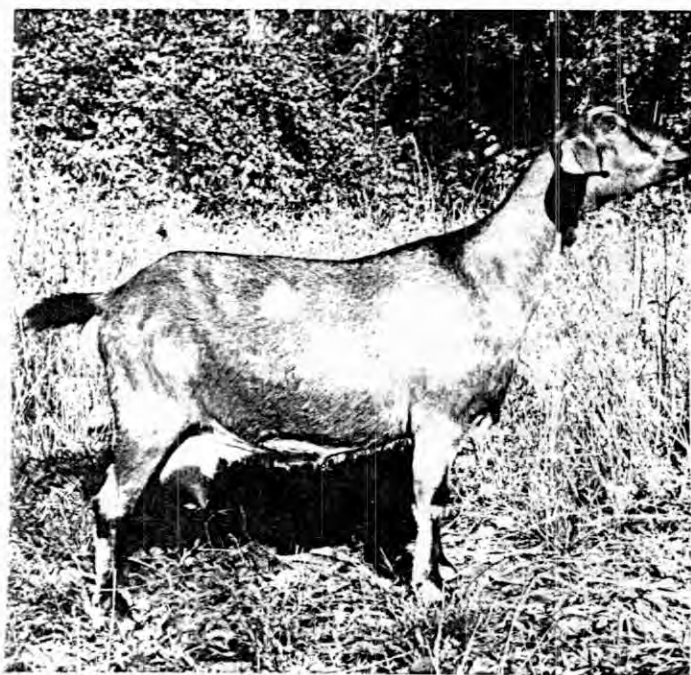
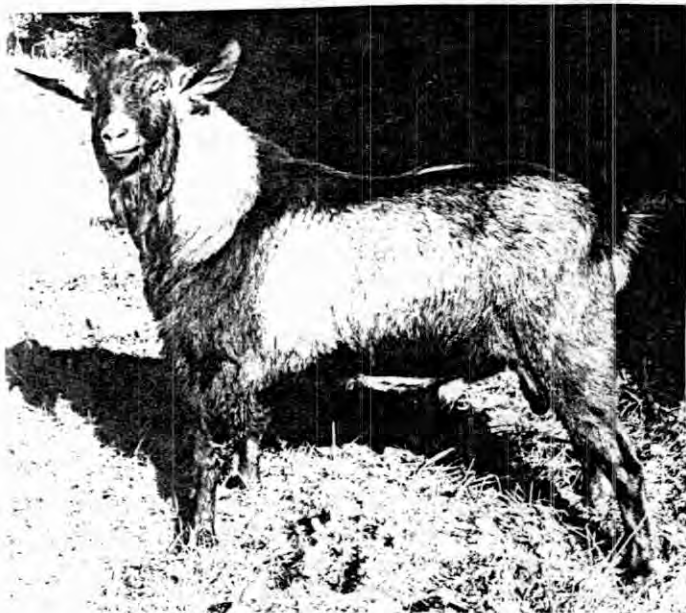
With the doe's extended breeding season the Kinder buck is in demand three-quarters of the year. (This extended breeding season requires no artificial inducement.) The buck at maturity is a well muscled, powerful and majestic animal. The castrated male (or wether) is utilized to it's fullest extent as a meat producer. The Association recognizes it's potential by providing chevon classes in sanctioned competition.

One exciting facet of a new breed and Association is the opportunity to get in at the ground level and participate in the

development of a new breed. What a "feather in the cap" of any breeder. For more information on the Kinder Goat Breeders Association, please send 5 stamps to:

KINDER GOAT BREEDERS ASSOCIATION
16212 BOTHELL-EVERETT HIGHWAY
SUITE F - 262
MILL CREEK, WA 98012

Please note: Upcoming kinder goat shows are announced in CashMirror Calendar of events.



DOC BOGART SAYS.....

Dr. Ralph Bogart is Professor Emeritus of Animal Science and Genetics of Oregon State University.

CHROMOSOMES AND GENES IN ANIMALS

By Ralph Bogart

If one were to cut out slices of body tissues, make slides of these tissues and stain the tissue, one would see little rod-like structures that are called chromosomes—chrom means colored and some are bodies so the chromosomes are colored bodies. These bodies are usually rod shaped and generally found as pairs but the members of pairs may or may not be located as pairs. These chromosomes are known as autosomes in contrast to the chromosomes one normally finds in the gonads (testis or ovary).

The autosomes are usually in pairs with members of a pair being identical in size and shape but the members of a pair of chromosomes may not be adjacent to the other member of the pair.

The chromosomes (autosomes) contain genes that have directed how certain characters developed. The two members of each pair of autosomes contain genes that govern how traits they control will develop.

If one makes slides of the gonad (testis or ovary) tissue, there are differences between male and female tissue. The female gonad tissue will have chromosomes in pairs with the two chromosomes of each pair being identical in size and shape. The male tissue may show either one large chromosome, the same size and shape as the chromosomes in a pair as is found in the female. This large chromosome may have a mate but it is much smaller. It may have no mate. We speak of the large and small chromosome pair as xy type since the female is xx type. If there is no mate to the large x chromosome in the male, he is described as xo male. The male is described as the xy type.

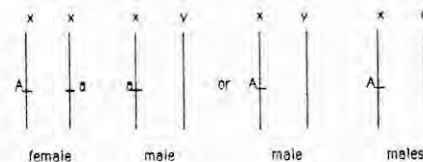
There are genes that are called sex-linked genes because they are located in the sex chromosomes but when the male is of the xo type, genes occur only in the x chromosome.

We normally show the large chromosome as a line and genes on it as illustrated:

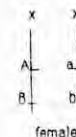


Since the male is either xy or xo type, he will have an x chromosome that is equal to one of the x chromosomes present in the female but the y will have few genes and if the male is xo type, there will be no sex linked genes except on the x chromosome.

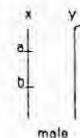
Now let us clarify some terms. We speak of sex-linked genes. This means that the genes are located in the sex chromosomes. Thus one might have an example of:



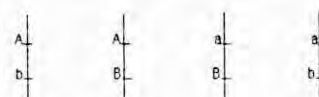
The y chromosome in most species contains few or no genes. We can have linkage of sex-linked genes. Suppose we have a female that is:



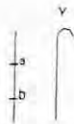
Mated to a male that is:



The female can produce 4 kinds of gametes:

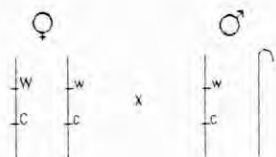


but since the male has no genes in the y chromosome, he can produce only two kinds of gametes:

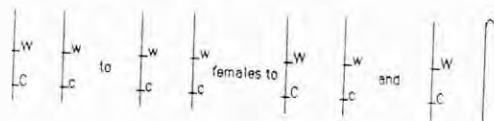


In a species where the male either has no genes in the y chromosome or he has only an x chromosome and no y chromosome, crosses involving such males generally show what was contributed by the female parent.

Suppose we have a cross where W=white down and w=brown down and suppose these are on the x chromosome. Also C=curly down and c=straight down and they are linked. We cross a female that is:



with a male that is wc. if we assume no crossing over in the female we would expect a ratio of 1 WC ♂ to 1 wc ♂ and a ratio of:



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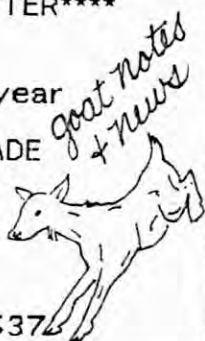
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What Does An Association Do for Me ?

Cashmere Producers of America
CaPrA President Bronwyn Schuetze

Cashmere Producers of America is an association of growers designed to educate the public about our exquisite luxury fiber and to support the growers in its development.

To facilitate the growth of America's new fiber industry, CaPrA has developed an educational program which is available to its members at no charge. A promotional display booth has been purchased to enable members to educate the public regarding cashmere at trade shows, fairs, and stock shows. Through the use of color photographs, fiber, and hand-outs, members are provided with a quality way to display their product.

In November, CaPrA will conduct its third annual educational meeting in Tulsa, Oklahoma. Each year we offer a series of workshops both for the experienced goat raiser as well as the novice. It is at these conferences that the pulse of the industry can be felt. Important networking between growers offers each person the ability to attain the needed information and support for growing more and better fiber.

Other educational material available to members is a newsletter published every other month continuing up-to-date information on cashmere goat raising in the United States. GoaTIPS, a notebook or manual has been developed by CaPrA to provide technical information, procedures, and support articles in all areas of cashmere goat raising.

As fiber identification is of paramount importance to the cashmere breeder, CaPrA will be conducting fiber workshops in three different areas of the country in 1990. In addition to general public education, CaPrA has supplied copies of the 1988 and 1989 conferences to all land-grant universities in the United States.

Presently, members of the executive committee are working with the Department of Agriculture in the promotion of cashmere goats as an alternative to chemical weed control.

Specific support to growers is an on-going process for CaPrA. Efforts are currently being made to establish a centralized market for meat. Through this coordinated effort producers will be able to sell their meat

animals directly to a slaughter facility.

Efforts are underway to establish a fiber pool facility where growers may send their fleece for evaluation and a team of independent experts will grade the cashmere before it is offered for sale. CaPrA hopes to have this operational for the 1991 cashmere grading season.

Although somewhat in the future, contacts have also been made to establish a United States testing facility which can readily accommodate the cashmere grower. Presently two universities have been contacted to look at setting up this kind of program.

In order to facilitate the breeding of fine cashmere in this country, CaPrA has established a registry which will provide growers with a tracking system for individual animals and certification of cashmere producing animals. All growers are welcome to register animals, however, reduced fees are offered to CaPrA members.

It is with pride that CaPrA has been accepted into the National Western Stock Show in January of 1991. The first CaPrA sanctioned show and sale will be held at this event. We are looking forward to over one hundred entries at this landmark event.

Through the educational programs and support to growers, CaPrA has been the motivating force behind many new growers and has provided greater vision to the "old time goat raiser". The production of cashmere in the United States has increased by 300% over that of 1989.

The significance to you as a grower is that CaPrA is the voice of this industry. All of our investments, in time or money or both, are being safeguarded by this association. Already our presence is recognized overseas as well as nationally. The fiber, meat, and skin industry is being connected for you by the members. I appeal to all of you to be part of this process. We know that the sum is greater than any of its parts. Certainly there is strength in numbers and through a coordinated effort this new industry can increase our individual worth. Participate at whatever level you are able to - just participate! We need each and every one of you. Our industry needs your

energy, your knowledge, and your emotional support.

For more information or membership please do not hesitate to contact the CaPra office at Box 443, Longmont, Colorado 80502.

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OR

The Secretary, CaPra
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THE ECONOMICS OF CASHMERE

By Kris McGuire, Research Committee
Cashmere Producers of America

Cashmere is a new American industry revolving around the oft overlooked and under-utilized domestic goat. Goats produce not only the most luxurious commercial fiber known to man, but also supple, long-wearing leather and delicious, low cholesterol meat. In addition, it is possible in some areas to receive income for grazing goats on weed ingested land; up to \$4/head/month.

Goats selected for their fiber production can be incorporated into existing agricultural enterprises resulting in income diversification and range improvement. Additionally, American producers can take pride in the knowledge that they are participating in yet another grass roots industry that is "Made in America."

Presently, Forte' Cashmere Company, Inc. and Amicale Industries, Inc., both American commercial cashmere buyers are exclusively reliant upon foreign markets to supply their mills. When the American cashmere industry is established, revenues will be earned not only by establishing interstate commerce but by increasing exports of meat, fiber and finished goods.

BREEDING STOCK - Because the cashmere industry in the U.S. is in its infancy, there are very few proven, top quality cashmere goats on American farms. Many Spanish goats produce quality cashmere, but their genotype (genetic make-up) is unknown meaning their potential to pass on the desired genes is unsure. On the other hand, some goats imported from Australia have been selected for four or five generations according to their ability to pass on the desired characteristics to their progeny. As of this writing, the total imported cashmere goat population intended to upgrade breeding stock in the U.S. numbers less than 1000. The best cashmere breeding stock suppliers in the U.S. will provide complete pedigree information and documented fleece tests with all animals they sell. The Cashmere Producers of America, CaPrA, can provide a list of recognized U.S. cashmere breeders and importers.

Cashmere down production in the United States was 69 pounds last year, mostly the result of shearing Spanish goats. There are currently 300,000 Spanish meat goats in Texas (CaPrA, 1989). With careful selection, Spanish

goats can produce saleable quantities of fiber. However, breeding these same selected does to high quality, imported bucks can greatly accelerate the genetic gain of the progeny. A viable fiber industry can be created in this country with careful selection of breeding stock only if priority is given to fiber diameter and its associated character and style. Quality must not be sacrificed for quantity. The U.S. cashmere industry could become viable if the existing 300,000 goat herd increases its numbers to over 2 million and in the process, is subjected to genetic pressure favoring fiber character and style. Emphasizing fiber character will serve as a built-in quality control measure. Too often, overseas producers have fallen into the trap of increasing production at all costs. It has cost them fiber quality. The American producer is in the unique position of making fiber character the hallmark of american cashmere. We must establish and maintain these very high standards to compete in the world market place.

MEAT MARKETS There is well-established meat market in Texas. Goats are slaughtered and sold at an average price of \$.75 per pound and buyers could sell more than is presently available. The market now services ethnic, primarily Hispanic and Arabic, populations. Chevron, young goat meat, is a firm, delicious meat, naturally low in cholesterol. The potential exists to expand this market not only into the diet-conscious American population but overseas where chevon is an accepted staple food. This expansion will be the result of selling lower quality cashmere producers and culls for meat.

BIOLOGICAL WEED CONTROL - Another potential use for cashmere goats is in weed and brush control. It is well recognized that browsing goats will thrive on land unsuited for cattle or sheep. In addition, goats can be used in conjunction with cattle and sheep grazing to control weeds that neither cattle nor sheep will eat when given the choice between weeds and more palatable plants such as grass. Goats will consume forbs (broad-leaved plants including many weedy species) and shrubs (brush) first, leaving the grass until last. In an era of chemical herbicide over utilization, goats could be used for environmentally safe weed and brush control. Northern tier states such as Montana, ND, SD, and Minnesota are able to reclaim leafy spurge

infested land near important waterways simply by grazing goats. Goats will also effectively control other noxious weed species such as spotted napweed, broom snakeweed, thistle, bindweed, and wild rose.

ECONOMIC COMPARISONS – Table I (next page) shows the relative income potential for some small livestock enterprises; top quality cashmere goats, selected cashmere goats unselected Spanish goats, Angora goats and sheep. Certain assumptions have been made and results may vary due to individual management practices. All efforts have been made to remain within realistic parameters and to present a balanced view of the potential offered by the cashmere industry. Capital needed for housing, fencing and water are assumed to be the same; whereas requirements for labor, feed and mortality are a function of the efficiency of the individual producer and are not included in this table. The table addresses the returns expected for each enterprise to allow comparisons among the enterprises. The prices for lamb, chevon, wool, mohair and cashmere fall within reasonable expectations, but for comparison purposes incentive payments made by the U.S. Government are not included because cashmere does not enjoy governmental price supports as do wool and mohair. Young animals kept for herd replacements or for sale as breeding stock are not included. Angora kidding rates are assumed to 80%, cashmere 150%, and sheep 100%. Good management practices requiring little intensive labor could increase the cashmere kid production requires an increase in intensive labor as Angora goats are just not as hardy as cashmere goats or sheep (Sims, 1990).

Capital investment in breeding stock then becomes the single most important consideration. Imported, top quality cashmere breeding stock can be obtained at prices ranging from \$2,500 to \$6,500 per head. Selected cashmere producing Spanish does will cost \$100.00 to \$300.00 each. Progeny resulting from Spanish does and imported bucks, referred to as "bred-on" cashmere goats, will sell for \$600.00 to \$1000.00. These bred-on animals can exhibit up to an 80% increase in fiber production over their dams (Buffier, 1983).

It is important that potential investors in the cashmere industry carefully define their breeding goals before investing in their first goat. If land that is unsuitable for use by other grazing animals is available, a small Spanish goat herd bought at reasonable prices

and bred to a selected cashmere buck can attain a moderate return over time. In the interim period, the land will be utilized and could be eventually improved.

It is possible to attain impressive results very quickly by purchasing top quality, imported bucks to cover an existing Spanish goat herd, or by investing in a bred-on herd. Moderate income from fiber sales can be realized and the herd can gradually be upgraded. Most F1 progeny (first generation bred-ons) will exhibit a substantial increase in fiber production over their dams due to "hybrid vigor." It is the F2 and F3 (second and third) generations that must be carefully culled as these generations are probably heterozygous for the desired phenotype (physical characteristics). This means that only 50% of the progeny will tend to revert to the midpoint of the preceding generations's genetic capability. The rest will exhibit phenotypes of either maternal or paternal grandparents or great grandparents.

Those with substantial investment capital can buy the best cashmere goats available and begin a goat stud, selling the resulting kid crop. Here again, all progeny resulting from top quality animals will not always mirror the preceding generations's phenotype because of genetic variations with the inheritance of quantitative characteristics (Nel, 1990). They may be coarser or finer, with more or less fiber production. But fiber diameter and fiber production are highly heritable (Couchman, 1984) and when dealing with pedigreed stock from carefully selected ancestors, the possibility of a generation exhibiting a preceding generations's phenotype is an exciting possibility because these individuals may be homozygous for the desired traits. This means they can contribute desired genes to all their offspring.

Until specific genetic heritability (homozygosity) for all the desired traits has been demonstrated for successive generations, there is no such thing as a "purebred" cashmere goat. The perfect genotype has not yet been demonstrated and more years of intensive breeding are necessary to achieve this goal. Breeding selection is underway and with the planned establishment of a CaPrA sanctioned Cashmere Goat Registry, breed improvement will be documented.

There are many scenarios involving varying levels of investment and differing breeding goals. Cashmere goat enterprises at whatever level are an exciting addition to existing

Table 1. Comparisons of Total Potential Annual Income for Top Quality Cashmere Goats, Selected Cashmere Goats, Unselected Spanish Goats, Angora Goats, and Sheep.

	Top Quality Cashmere (1 doe + progeny 150% prod)	Selected Cashmere (1 doe + progeny 150% prod)	Unselected Spanish (1 doe + progeny 150% prod)	Angora (1 doe + progeny 80% prod)	Sheep (1 ewe + progeny 100% prod)
MEAT - from progeny					
Annual Prod ¹	75#	75#	75#	40#	100#
Value/#	\$.75	\$.75	\$.75	\$.50	\$.60
Income/Year	\$56.25 ²	\$56.25	\$56.25	\$20.00	\$60.00
FIBER - from progeny					
Annual Prod.	112.5 g	75 g	22.5 g	2#	5#
Value	\$99.00/kg	\$99.00/kg	\$99.00/kg	\$5.30/# ³	\$1.00/#
Income/Year	\$11.14	\$7.43	\$2.23	\$10.60	\$5.00
FIBER - from dam					
Annual Prod.	200 g	140 g	50 g	12#	10#
Value	\$99.00/kg	\$88.00/kg ³	\$99.00/kg	\$1.20/# ⁴	\$.50/#
Income/Year	\$19.80	\$12.32	\$4.95	\$14.40	\$5.00
TOTAL INCOME/ DAM/YR					
	\$87.19	\$76.00	\$63.43	\$45.00	\$70.00

¹Production levels based on information from Bell, 1985; Sims, 1990; Couchman, 1984; and Jordan, 1989. Assume 100# lambs and 50# kids are marketed.

²Sale of quality kids as breeding stock or fiber producers is obviously more lucrative, but for comparison purposes, meat market prices are assumed.

³Prices, expressed as \$/pound for wool and mohair, do not reflect current government price supports.

⁴Cashmere is averaged at \$88/kg for all micron diameters less than 19 microns.

agricultural enterprises resulting in income diversification. The American cashmere industry holds many exciting possibilities. Cashmere is a new American challenge for ranchers and the potential exists for the United States to become a major world producer of this exquisite and profitable fiber. More information concerning this new and exciting business can be obtained by writing:

Cashmere Producers of America (CaPrA)
P.O. Box 443
Longmont, Colorado 80502



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CASHMERE COMES TO PIONEER MOUNTAIN

By Ann Dooling

Cashmere has been produced for centuries, the bulk of it coming from China. Chinese Cashmere is the finest in the world, mainly because the animals are virtually starved; very little vegetation is left on the plains of Inner and Outer Mongolia, and the animals run free all year except when they are brought in for combing in the spring. Iran and Afghanistan together are the second largest source of Cashmere, but the fiber is much coarser than the Chinese.

Now that China is end-processing most of its raw fiber, very little of it is available in the world market place, and recent political problems in Iran and Afghanistan have made the export of cashmere from those regions quite difficult. These factors have increased the profitability of cashmere production in other countries, but the animals are hard to find. Because of rampant disease, export of Chinese, Iranian, and Afghan animals is impossible. Some years ago, Australians discovered Cashmere fiber on their feral goats and, through selective breeding and heavy culling, have produced animals whose yields and fleece weights are quite high.

BEFORE: PIONEER MOUNTAIN FARM

Our farm sits on the floor of a high valley at an altitude of about 5,600 feet. It is named for the beautiful Pioneer Mountain Range that looms to the west. The Rocky Mountains surround and protect us on all sides, making ours the sunniest location in the United States. Average annual precipitation (if we are lucky) is 12 inches; we never have any snow to speak of and have never plowed our driveway.

For quite some time we were mostly hobby farmers, with jobs in town to keep us going. We raised rabbits for fiber and meat, some cattle, a few colored sheep for the handspinning market, a few chickens, seven geese (which we call our barnyard clowns), a horse to chase and gather the cows and sheep, and the usual dogs and cats. However, we really wanted our 107-acre farm to support itself and maybe even make a little money. We considered a commercial chicken operation, llamas, a commercial rabbitry, fishing worms which could be cultured under

rabbits, and even trout farming. Being a handspinner, I was drawn to fiber animals, and eventually we gathered a few "practice goats" (all crosses between Angora and other breeds) from around the state to learn the basics of handling and raising them. They produced a fiber much like fine mohair, but it is unsalable except to few handspinners. When I finally discovered that cashmere, the luxury fiber that has been prized worldwide for centuries - grows on goats, I knew I'd found my calling.

CASHMERE TRAVELS FIRST CLASS

We decided that the process for importing goats is essentially the same whether you import 2, 20 or 200 animals, so I applied to the USDA for an import permit and made arrangements to bring in 200 Australian Cashmere goats (the largest number that could be handled at the Honolulu quarantine station). We went to Australia and selected our goats from the country's most progressive and outstanding herd, and we had the 194 does bred to different bucks than the 6 we brought in. The animals were quarantined on the originating farm for 30 days and given all the required tests; then they were quarantined for another 30 days in Melbourne by the Australian government and given the same battery of tests; then they were prepared for shipment to Honolulu for another 30 day quarantine. They were shipped on a Qantas 747 jumbo jet in two three deck crates, each containing 100 goats. Two hundred animals required more oxygen than the cargo hold could supply, so the goats had to travel in the passenger section, which was specially modified for this shipment. I'm told they behaved very well; I imagined them sipping martinis and watching *Crocodile Dundee* on the wide screen!

In due time they arrived in San Francisco, flown in the same crates in the same modified Qantas jet. They were very happy to get out of their crates, even if it meant getting into a double-deck cattle truck. On the 22 hour drive home, they attracted quite a bit of attention at truck stops; every time we stopped, 200 noses and 400 eyes appeared in the little oval holes in the trailer.

Two months after their arrival, they produced 200 kids, making ours the largest imported herd in the United States. We are expecting another 250 kids or so this May. The goats' hardiness and adaptability are astounding; we moved them not only from one hemisphere to another but from their summer into our summer, which gave them two summers in a row. Their cycles of reproduction and fiber growth were severely disturbed, yet their conception rate is high. They are adjusting readily to our season, and their fiber production is excellent.

AFTER: PMF CASHMERE COMPANY

The purpose of PMF Cashmere Company (a name derived from the farm's name) is to provide good breeding stock with which other breeders can start herds or add good genetic material to their existing stock. It's a family operation; several of our sons pitch in to build fences, shelters, and feeders, I handle and feed the goats, and keep up with the usual farm-type chores. We're casual about our day; we start feeding at 8:30 or 9 a.m., and it only takes about 20 or 30 minutes. The goats are fed grass hay most of the year, with grain supplements just before breeding and again around kidding time. Our farm is laid out with a 2,500-foot-long, 16-foot-wide runway bounded on each side by a total of thirteen 5 to 10 acre "paddocks." The paddock gates are 16 feet wide so that, when we need to move a group to the sorting pens, opening the gate closes off the runway and forces the goats to go in the right direction.

Every precaution is taken to keep contaminating colors out of the fleeces during shearing. At least two weeks before shearing, the goats are separated into color groups. This allows time for the wind to blow away any different-colored fiber the goats may have acquired from one another. The goats are then shorn: White goats first, gray goats second, and brown goats last. Because color varies considerably, fleeces are bagged individually. They are then shipped off to the buyer (the dehairer) in Rhode Island and evaluated individually to be sure that the mean fiber diameter is between 11 19 microns.

Cashmere goats are easy to take care of. They thrive at all altitudes and in all types of weather, except perhaps in very rainy, damp places. Except for the intensive times during shearing, hoof trimming, vaccinating, and drenching, there is very little to do. They kid on their own, without assistance, and easily

raise twins and triplets.

The best part of raising Cashmere goats is that they will eat all the weeds you offer them. Areas of our farm that were quite brushy or too weedy for the cows have been turned into park-like areas with lovely grass. I don't know how they can turn a weedy, nonproductive area into one with lush grass, but they do. They also co-graze efficiently with sheep and cattle because they are browsers and do not compete for the same forage. They are a wonderful diversification for existing ranchers and operators because they produce a valuable fiber and prolific breeding stock. Interest in cashmere goats is growing rapidly all over the nation, and all of us in the industry hope that cashmere will someday be as common a crop as wool.



ANN DOOLING of PMF Cashmere shows off the fleece on one of her cashmere does.



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AMERICAN GROWERS TAKE STEP IN THE RIGHT DIRECTION

In past issues of CashMirror we have reprinted articles from Dr. Barry Restall and Dr. Bill Patties' research at the New South Wales Department of Agriculture, field station at Wollongbar, Australia. The many questions and requests for information that resulted from publication, prompted the first basic genetics and fiber identity seminar for American cashmere growers.

The "Step in the right Direction" seminar featured the two Australian researchers and the practical use of their research results. The main topics were "The Genetics of Cashmere Production" and "Reproduction Results and Responses to Selection." In addition, growers were informed how they can use breeding schemes to reach their breeding goals.

On hand to confirm the importance of careful breeding and selection were the two American cashmere processors. According to Hugh Hopkins, General Manager of Forte' Cashmere Company, "The bottom line is that if it is not cashmere - we will not buy it." Jerry Kaplan, Vice President of Amicale Industries, Inc. outlined in a slide presentation to the group that he is in the business of buying quality cashmere - nothing less. According to Kaplin, Amical buys "the best in the world and this is a great opportunity for the American goat farmer if they do their homework"

Once the new growers understood the importance of quality fiber the audience was divided into groups to work with fiber samples from around the world. Each grower was given the opportunity to visually asses samples for fineness, down weight and style. Jill Darrah, Bron Schuetze, and Judith Richarson were available to compare the visual results with actual fleece tests. "The interest in this part of the seminar is incredible" said Hugh Hopkins "These people can't get enough of strengthening their own ability to asses fleece! This is very exciting for a processor to see."

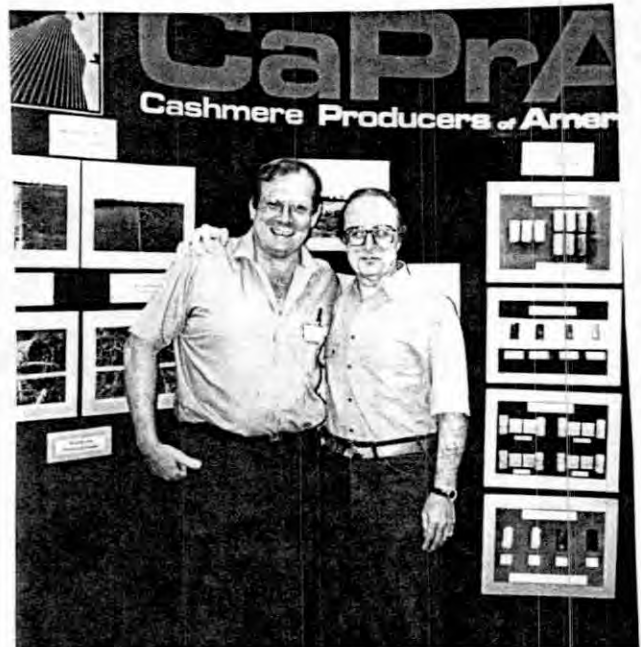
Judith Richardson, publisher of CashMirror, summed up the success of the seminar with: "Those in attendance have gone home with valuable tools. They have come to a better understanding of the inheritance of cashmere and they have developed the ability to start assessing their own fleece in the field. This is truly a step in the right direction."

Seminar notes are available for \$15.00 from

CashMirror, 200 Larson Road, Silver Creek, Wa. 98585.



CashMirror Publications' Publisher, Judith Richardson and Editor, Wendy Paulin, received the Prized Pluck Chook award for their contributions to the July "Step in the Right Direction" seminar.



Hugh Hopkins, General Manager Forte' Cashmere Company and Jerry Kaplan, Vice President of Amicale Industries, work together to help new cashmere growers understand the cashmere market.



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