Newsletter of the European Network for Increased competitiveness of high quality European Animal fibres by improving fibre quality

Editorial

by Claire Souchet, Project administrator

The Thematic Network - Increased competitiveness of high quality European animal textile fibres by improving fibre quality, FAIR3 CT96 1597- is now in the middle of its second year of existence and is well established.

The second workshop, held in France in March, was very successful with great enthusiasm being shown for the Network's activities. This workshop, on "*Establishment of common European protocols for the recording of genetic performance data for speciality fibre producing animals*", was hosted by Dr Daniel Allain, in Castres, France, on the 9-10th March 1998. Thirty-six participants were present, mainly scientists and producers involved in breeding programmes to improve the quality and quantity of animal fibres. The discussions were fruitful and completed the ideas developed during the first workshop in Spain, last year. More information about this workshop is available further in this newsletter and a full report is being prepared.

The round trial on fibre quality measurements, using OFDA methodology, organised by Dr Ho Phan (DWI, Germany), for cashmere and mohair fibres, is nearly completed. Results, to assist in demonstrating the value of the OFDA methodology, will be available later this year. More details will be given in the next newsletter, scheduled for end of November 1998.

The series of the EFFN workshops continues. After the success of the first two, we hope that the third workshop, on "*Quality assessment and the requirements of the fibre manufacturing industry*", will be as profitable. It will be held in Germany, on the 4-5th September 1998, and will be hosted by Dr Phan, from DWI. More information is available on page 15.

Finally, after the great response following the publications of the earlier newsletters, we hope that this third issue will continue to be of interest and we look forward to hearing further from those who will receive it. Articles are welcome; do not hesitate to contact the network administrator, Ms Claire Souchet.

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Inside this volume:

Report of meeting of members of the fine wool sub-group

by Claire Souchet,
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from the A.T.E.L.I.E.R. report "Rapport du programme d'échange "Mérinos" St Martin de Crau (France), du 10 au 16 février 1998."

Following the EFFN workshop in Spain (October 1997), one Danish and two French participants of the fine wool sub-group decided to develop a technical exchange to compare experiences in term of fibre evaluation and grading methods.

A.T.E.L.I.E.R. (*Association Textile Européenne de Liaison, d'Innovation, d'Echange et de Recherche*) organised the exchange, which took place during a training period for wool grading in the South of France. A visit to a local spinning mill allowed an understanding of the need of a grading system.

The following is a summary of the reports from Mr Hervé Tripard (*UPRA Mérinos d'Arles, France*), Mr Joseph Rémillon (*UPRA Mérinos de l'Est, France*) and Mr Jens Pedersen (*Danish Merino Breeders Association, Denmark*).

Over the last two to three decades, fine wool production in Europe has been badly neglected, in preference to imported fibres from the Southern Hemisphere. Despite this , major populations of Merino sheep are still maintained in Europe. One of these populations is the Merino d'Arles, located in Southern France and amounts approximately 300,000 animals. Within this population, the *UPRA Mérinos d'Arles* group accounts for some 25,000 sheep, representing 30 breeders.

As part of the promotion and improvement of the breeding standard of the Merino d'Arles, the UPRA group holds every year a **ram sale** and a **breeding stock show** in St Martin de Crau (France).

Mr Jens Pedersen participated to the jury of the breeding stock, with Mr Claude Gutapfel, French wool trader, and Mr Eric Sambet, breeder.

Young rams and ewes were evaluated in relation to their wool. Wool characteristics (body cover, density, length, fineness and uniformity) were each scored from 1 to 10. The rams were in two age groups, and the ewes were presented in 4 groups (four ewes of mixed ages, three ewes with lambs of mixed ages, four hoggets in a group and four lambs in a group). The wool was fine (19 to 21 microns) in most animals, with little variation from shoulder to hindquarter. The tradition of such a show is to exhibit the breeding ewes in groups of mixed age. However, it would give a better idea of the breeding quality if the groups were of the same age.

The selected rams for sale were 18 months of age. They were presented into three categories:

1. E: the best of the rams.
2. A: good rams, but not quite of the standard of E.
3. B: other rams that met the minimum standard.

All rams have been selected from the top breeders of the UPRA flock. These rams are indexed on their wool characteristics and production rate.

The numbers of Merinos indicate that there would be enough fine wool produced to obtain a much better price for it. To obtain such, the fine wool needs to be classified, pooled and marketed to suitable markets in Europe, in competition with the Southern Hemisphere.

Presentation of the Merino sheep in St Martin de Crau

The **spinning mill of Chantemerle** was the next stop on the visit exchange. This spinning mill has been active over the past two decades. They processed up to 15 tonnes of greasy wool per year. This mill uses the Merino d'Arles fine wool to produce high quality garments. The fine wool is sometimes processed with other fine fibres, such as angora and mohair. All products are in natural colours; specific colours are obtained by fibre mixing rather then by dying. The finished products are of excellent standard and quality, being manufactured in a traditional way.

The spinning mill, next to the "Guisane" torrent

The last event of this exchange was the **shearing and wool grading of the Merino d'Arles fleeces,** in the Mas de Grenier (France).

The aim was to share practical experiences to reach an agreement on fleece sorting and scoring after shearing. Homogenous batches of fine wool could be then sent to manufacturers, at a higher price. Some members of the French Sheep Shearers' Association (Association des Tondeurs de Moutons) were present.
A demonstration of shearing was also performed.
The grades for the fleeces were :

- A: Best fleece, good length, good yield, good fibre strength, no colour.
- AB: Fleece with reasonable yield, reasonable length, good fibre strength, no colour.
- B: Fleece with lower yield, shorter length, weak fibre, some colour.
- BC: Fleece that does not fit in the above categories.

All fleeces in Mas de Grenier were of the AB grade or higher.

Mr Jens Pedersen, who had worked in Australia for many years, explained the Australian way of sorting the fleece:

1. Take the fleece, just after shearing, by the two britch ends, and pull it to the shoulder ends. In this way, the fleece can be unfolded easily on the sorting table.
2. Clean the fleece, to get rid of the parts that are soiled, too short or too yellow, like the britch ends, the shoulder ends, the head and tail. Then, the parts which contained too much straw and paint are also eliminated.

A very clean fleece is obtained. It can then be graded, according to fineness, staple length, strength and lustre.

This method of sorting requires great attention to detail, so that any default can be recognised and homogenous batches of wool can be obtained. A certain skill is needed. This is the best approach to enhancing the value of the wool of the flock.

Fleece grading and sorting in the Mas de Grenier

During this week-end, a film crew was filming all the stages of the operation, from the wool on the sheep's back, through the shearing, the weighing, record keeping, sorting and grading processes to the bale of wool. This filming is part of a film "*Wool and Mankind, an old story with new adventure*". It should be finished later this year and translated into five languages.

Multi-line selection in a Finnsheep nucleus

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Abstract

Nucleus breeding in a 250 ewe Finnsheep flock was started in 1986, and was divided into three selection lines: meat, wool and fleece production. The meat line had almost twice the number of the other ones. The aim was to find appropriate measurements and evaluation methods required by the selection objectives of the three lines. The main objectives in the meat line were growth rate and scanned meat qualities; in the other lines, there were specific wool traits, with less emphasis on growth rate. Covariance components were estimated by an animal model, using the AI-REML algorithm in the DMU package. Heritabilities ranged from 0.32 to 0.55 for growth rates, and around 0.50 for muscle measurements. Estimates for wool and fur traits ranged from 0.13 to 0.52 and 0.06 to 0.38, respectively. Litter size remained constant through the years, averaging 2.72. Genetic trend for lamb birth weight was slightly upwards. The genetic change from 1986 to 1996 for 120-day live weight of all lambs in the flock was 1.2 kg, with a clear difference of 1.4 kg between the meat and the two other lines. Selection improved efficiency of growth, without changing the mature live weight of the Finnsheep ewe. A moderate positive genetic correlation of 0.29±0.04 was found between the weight of lambswool and the lamb live weight at shearing. A small genetic improvement of 0.2 kg in ewe wool weight was found. The results support the previous findings that Finnsheep has some special fleece characteristics, which can be improved by efficient selection.

Introduction

Finnsheep are widely known for their high prolificacy. However, less is known about other breed characteristics. Meat production has been the main breeding objective in Finland. Central performance testing of young rams has shown that remarkable progress has been made in selection for growth rate (Puntila, 1988; Puntila, Kolunsarka and Nylander, 1995). Disadvantages of the breed are connected with unsatisfactory carcass conformation and meat qualities. To improve the general profitability and to increase competitiveness in sheep production, in the country where Finnsheep has preserved its predominant status, it has been essential to develop other production traits, such as wool and fleece. Studies in the 1930's and 1940's indicated special wool and fleece characteristics in the Finnsheep (Puntila, 1987). Breeding studies for the versatile use of Finnsheep were started in 1986 at the stateowned (prison) farm of Pelso. The aim was to find appropriate measurements and evaluation methods required by the selection objectives for the meat, wool and fleece lines. The phenotypic and genetic trends in these lines are reported here.

Materials and methods

Description of the nucleus flock

A base population from the Pelso breeding flock, with a few outstanding ewes purchased at the beginning, was divided into three selection lines: meat, wool and fleece. The lines were kept separated. The number of white ewes over the years was about 250. The meat line was nearly twice the number of the others. The breeding work was concentrated on white Finnsheep. The same unit also functioned as a gene bank for coloured Finnsheep. Selection objectives for the meat line were growth rate, meat qualities and carcass traits; weight and quality of fleece for the wool line and fleece characteristics for the fleece line. In both the wool and fleece lines, a moderate growth capacity was presumed. More detailed information about the selection objectives has been reported by Puntila, Mäki-Tanila and Nylander (1990), although selection criteria have been somewhat revised since. Each year, some 20 to 30 per cent of the best ewe lambs were kept as replacement ewes. Only young rams with promising results were purchased from the national performance test; therefore, the nucleus flock was kept closed. Unfortunately, there were difficulties in finding outstanding individuals for wool and fleece lines. Six to eight rams were used yearly in the meat line and only three to four in other lines. Most of the rams were used for more than one year. Some rams were used later in other flocks. Inbreeding was avoided in the mating scheme.

Data recording and evaluation procedure

A total of 2778 matings was carried out and 2534 ewes were lambed. Lambing occurred in February and March. The overall number of lambs born was 6870, averaging 625 per year. Lambs were weaned at two months of age, except for a few during the first years, when the ewe lamb followed the dams until the 120 day-weighing. To increase profitability of the flock and growth rate, a systematic, partially artificial rearing system of lambs from multiple births was introduced in 1994. In this system, ewes had only one or two lambs (uniform in birth weight) to rear. All the excess ones were removed and transferred to a fully automated milk replacer feeding unit. The weaker lambs had been transferred earlier for artificial rearing. The lambs were weighed at birth (BW) (12-hours and 3-day weights), 6 weeks of age (42W) and at weaning (two months of age). Post-weaning live weights were recorded before being turned out to pasture, at 120-days of age (120W), usually during the live animal evaluation and before slaughter. Ultrasonic measurements were taken at 120-days and, in some cases, before slaughter. This treatment was for the meat line lambs. Fleece characteristics were assessed on the lambs at about six months of age, soon after shearing and wool weighing. Fleece data included also fibre diameter measurements (n=101 lambs), based on the airflow method. Fleece traits, including neck skin thickness, were judged a month earlier. Skins after processing were also studied. Ewes were shorn twice; before lambing in the winter and in the autumn when they were housed. They had been weighed before going to pasture and at the beginning of indoor feeding.

Statistical methods

The performances of lambs, in different lines, were first analysed by the least squares analysis (SAS GLM procedure), to evaluate non-genetic factors. The fixed effects included birth year, sex, type of birth and rearing, age of the dam and age of the lamb. For wool and fleece traits, age at shearing, evaluation and live weight of lamb were used as covariates. For maternal genetic influences, variance components for direct and maternal effects, and covariance components between effects were estimated by REML procedures with the single trait animal model. The DMU package, with AI-REML algorithm (Jensen & Madsen, 1994), was used. Estimates of genetic trends for different traits were based on the mean predicted breeding values.

Results and discussion

The overall fertility in the flock was estimated at 90%. Litter size at birth for yearling ewes was 1.60 (s.e. 0.06) and 2.68 (s.e. 0.07) for older ewes. The least squares means for prolificacy and litter weight at birth and 42-days of age, at the first lambing and later lambings, are presented by lines in Table 1.

Table 1. Least squares means (±s.e.) for litter size and litter weight (kg) at birth (3-days weight) and 42-days of age, by selection lines (coloured ewes as a comparison).

		At birth		At 42-days of age	
Ewe line	n	litter size	litter weight	litter size	litter weight
First lambing					
meat line	274	1.95±0.05 a	5.87±0.13 a	1.88±0.05 a	24.4±0.54 a
wool	163	1.92±0.06 a	5.81±0.17 a	1.89±0.06 a	24.2±0.70 a
fleece	158	1.84±0.06 a	5.56±0.17 a	1.79±0.06 a	22.0±0.71 b
coloured	136	1.85±0.07 a	5.73±0.18 a	1.80±0.06 a	21.9±0.76 b
Total	731				
Later lambings					
meat line	928	2.66±0.07 a	9.71±0.20 a	2.55±0.07 a	37.6±0.92 a
wool	393	2.60±0.08 a	9.62±0.24 a	2.50±0.08 a	36.5±1.07 a
fleece	572	2.74±0.07 b	9.89±0.21 a	2.65±0.08 b	37.4±0.97 a
coloured	410	2.67±0.08 a	9.15±0.23 b	2.60±0.08 b	34.2±1.05 b
Total	2303				

Means within a column and within a class not followed by the same letter differ significantly at the 0.05 level.

At first lambing, there was no difference between lines for litter size at birth and 42-days of age. The older ewes of the fleece line seemed to be slightly more prolific. Total litter weights of older ewes were quite uniform between lines, whilst non-selected gene bank coloured ewes produced lighter litters, as was expected. Least-square means for lamb weights at birth, 42-day and 120-day of age, by lines, are shown in Table 2.

Direct and total heritabilities of lamb live weight increased with the age until slaughtering, while maternal heritability declined. These findings are in agreement with Swedish studies (Näsholm and Danell, 1996), where it was postulated that, if maternal effects exist but are not considered, estimated additive genetic variance will include, at least, part of the maternal variance.

Table 2. Least squares means (±s.e.) for lamb weight at birth, 42-day and 120-day of age by lines (non-selected coloured as a comparison)

	Birth weight		42-day weight		120-day weight	
	n	mean	n	mean	n	mean
Meat	3015	3.38±0.02 a	2894	14.69±0.11 a	2604	29.21±0.19
Wool	1331	3.42±0.03 a	1286	14.64±0.12 a	1100	28.80±0.22
Fleece	1864	3.36±0.03 b	1811	14.21±0.11	1639	27.55±0.20
Coloured	1359	3.17±0.03	1325	13.13±0.12	990	25.74±0.23

Live weights within a column for a given live weight that are followed by the same letter do not differ significantly ($p<0.05$).

Birth weights were not significantly different between the meat, wool and fleece lines; only coloured animals, as a reference group, differed significantly, not only for birth weights but also for later live weights. At six week of age, the lambs in the meat and wool lines had kept the same growth rate but after weaning, the lambs in the meat line were slightly significantly heavier than the lambs in the wool line. It should be pointed out that the considerable improvement in the live weights at 6 weeks and 120-days of age was achieved after introducing the artificial rearing system for lambs from litters of two and more lambs per ewe. Good growth performance in the wool line resulted largely from the high genetic merit of a few sires.

Heritabilities estimates for growth rate from birth to 120-days of age, ranged from 0.55 to 0.32; for ultrasonic muscle area and depth measurements, they were around 0.50. For maternal genetic influences, variance components, for direct and maternal effects, were also estimated. Heritabilities for direct (h^2) and the direct-maternal genetic correlation (r_{dm}) for lamb live weights from birth to 120-day of age are given in Table 3.

Table 3. Genetic parameters for lamb live weights

Trait	n	h^2_a	h^2_m	h^2_t	r_{dm}
Birth weight	7567	0.132	0.149	0.236	0.141
42-days live weight	7316	0.159	0.104	0.235	0.125
120-days live weight	6333	0.221	0.020	0.303	0.772

h^2_a = direct maternal, h^2_m = maternal heritability,
h^2_t = total heritability, r_{dm} = direct maternal genetic correlation

It is then expected that estimates of direct heritability are lower when maternal effects are included, if the direct-maternal genetic correlation is positive. In this study, maternal heritability estimates for birth weight were lower than the estimates presented by Maria at al (1993) for Romanov sheep, Burfening and Kress (1993) and Näsholm and Danell (1996), but consistent with the estimates of Tosh and Kemp (1994), in prolific Romanov sheep. Direct-maternal correlations were positive and seemed to increase with age of lamb. Näsholm (1994) also assumed these to be positive. Contrary assumptions have been presented by Robison (1981), Maria et al (1993) and Tosh and Kemp (1994). Heritabilities from bivariate analyses were quite similar to those from single trait analyses. The positive, rather high, maternal correlations between BW and 42W indicate a high maternal effect on lamb growth. Therefore, maternal genetic effect should be included in the genetic model, which has not yet been taken into account in the official Finnish Sheep Recording Scheme.

Coefficient of variation was largest in BW (24%), decreasing with age (at 120-day, 15%). Variation for meat qualities in Finnsheep was remarkably low, the coefficient of variation for ultrasonic measurement ranging from 0.10 to 0.17. Genetic correlation between 120W and the eye muscle area was 0.33 (s.e. 0.10), indicating that there is a certain potential to simultaneously improve growth rate and meat qualities.

The heritability estimate of 0.44 for the mature ewe live weight (autumn weight) is consistent with literature: estimates varying between 0.30 and 0.50 (Stobart at al, 1986; Woolaston, 1986; Näsholm, 1994).

Means, standard deviations, heritability estimates, genetic and phenotypic correlations for wool weight and quality traits are shown in Table 4.

Heritability estimates for lamb fleece weight, staple length and wool grade, were moderately high (0.35-0.50), but generally lower for evenness, lustre and density. The moderatly high heritability estimate for wool grade resulted from the relatively objective method of assessing fineness, based on crimp frequency. The heritability estimate of 0.41 (s.e. 0.06) for fleece weight, also in good agreement with the estimates of Fogarty (1995), for wool and dual purpose breeds and with those of Notter and Hough (1997) in Targhee sheep. The mean heritability for the annual fleece weight of adult ewes was 0.37. The genetic correlation of lamb fleece weight with live weight at shearing was 0.29 (s.e. 0.04) (phenotypic correlation 0.37), which means that there is no antagonism in selecting simultaneously for both fleece and live weight. This estimate in Finnsheep is somewhat smaller than in Targhee sheep (Notter and Hough, 1997), and that stated in the review of Fogarty (1995). Fleece weight had quite a favourable genetic evaluation (Mortimer and Atkins, 1994). The mean fibre diameter for lamb fleece was 23.4 microns (CV 7.4%). This finding is in good agreement with a Finnish study from progeny testing of 11 selected Finnsheep sires by Haykal (1981). In the current study, fleece of ewes (n=53) had a fibre diameter ranging from 25.4 to 34.0 microns (CV 6.6%). The age of ewe tended to have an effect on fibre diameter.

Subjectively assessed fleece characteristics showed low heritability estimates, except for the size of the curl (Table 5).

The genetic correlations between traits varied from 0.23 to 0.66. Phenotypic correlations were somewhat less, between 0.21 and 0.35. The objective measurement, thickness of skin (neck) with a h^2 of 29±0.05, is a valuable tool for selection of light skins.

A ten-year breeding study allowed the estimation of genetic trends. Figure 1 shows genetic improvement in lamb live weights (maternal effects included in the model when predicting breeding values). BW remained unchanged between the lines.

Table 4. Mean, standard deviation, heritability estimates (± s.e.) (on diagonal), genetic (above diagonal) and phenotypic (below diagonal) correlations for fleece weight and quality.

	mean	s.d.	FW	WG	SL	E
Fleece weight (FW)	1.28	0.37	**0.41**(0.06)	-0.55	0.59	-0.38
Wool grade (WG)	53.99	1.22	-0.23	**0.47** (0.06)	-0.84	0.69
Staple length (SL)	8.50	1.72	0.34	0.60	**0.52** (0.06)	-0.49
Evenness (E)	2.55	0.56	-0.01	0.27	-0.17	**0.13** (0.04)

Table 5. Mean, standard deviation, heritability estimates (± s.e.) (on diagonal), genetic (above diagonal) and phenotypic (below diagonal) correlations for fleece characteristics.

	mean	s.d.	SC	L	D	TC
Size of curl (SC)	3.97	0.62	**0.38**(0.05)	0.44	0.45	0.52
Lustre (L)	4.40	0.71	0.27	**0.16**(0.04)	0.44	0.23
Density (D)	4.06	1.10	0.21	0.31	**0.06** (0.02)	0.66
Tightness of curl (TC)	3.74	1.37	0.27	0.32	0.35	**0.13** (0.03)

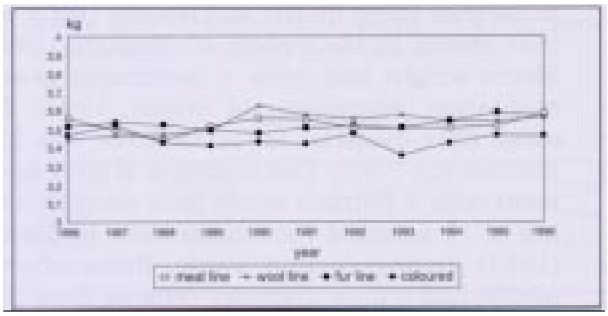

Figure 1a. Genetic trend for lamb live weights in Finnsheep nucleus flock. Birth weight (3-day weight).

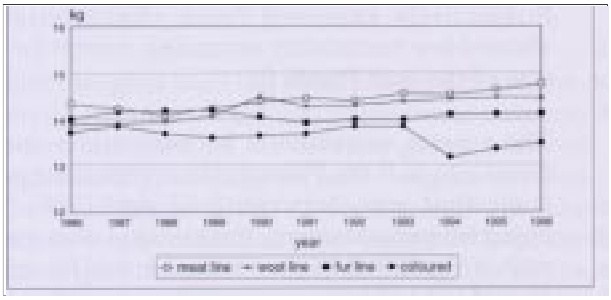

Figure 1b. Genetic trend for lamb live weights in Finnsheep nucleus flock. 42-day weight.

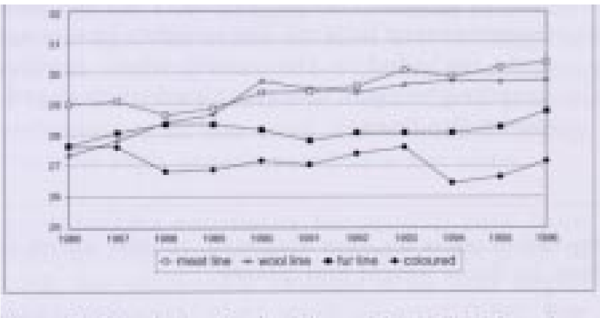

Figure 1c. Genetic trend for lamb live weights in Finnish nucleus flock. 120-day weight.

Higher genetic improvement was associated with increased lamb live weight at 42W and 120W. The rate of genetic change in the meat line was not much larger than in the wool line. This can be explained by different factors. Firstly, the number of ewes in the wool line was rather small and the same sires were used over several years. Secondly, in the meat line, the main selection criteria, within the last few years, had been meat qualities, based on BLUP-values for the ultrasonic measurements, instead of growth rate. Estimated genetic responses for 120W, within the past seven years, have been 0.9 kg in the nucleus flock, compared with 0.6 kg in the National Sheep Recording Scheme. Annual genetic response for 120W in the meat line was approximately 0.14 kg. Shrestha et al (1996) in Canada, reported, over 20 years of selection for lamb live weights, the following genetic improvements in Finnsheep, at birth, 21, 70 and 90 day of age; 0.02, 0.02, 0.03 and 0.05 respectively. In Norway, Eijke (1975) calculated an annual 0.25 kg genetic changes in weaning live weight. Genetic improvement in Finnsheep has also revealed that selection has been effective in improving growth rates without changing overall mature ewe live weight, which remained around 75 kg. The rate in genetic change for lamb fleece weight was small (Figure 2), likewise ewe wool weight.

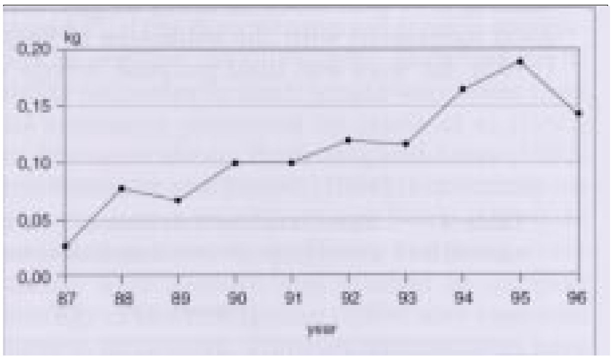

Figure 2. Genetic trend for fleece weight in Finnsheep lambs.

Genetic improvement in fleece quality was achieved for staple length. Wool traits are not considered in the genetic evaluation in the Finnish Sheep Recording Scheme, which produced difficulties in finding rams with recognised wool type genes. The same situation was manifested in the fleece line. The improvement in this line was observed through the size of the curl, its uniformity and the quality of curls (tightness). A clear indication of development in fleece traits was found when the processed skins were judged, following the same criteria as those used in judging live animals. A positive change was obtained in skin thickness, based on live animal measurement. The light skins are in great demand by fur fashion designers. Pure white colour is also favoured, because of its suitability for dying purposes.

Conclusions

This study provided evidence that there is genetic variability in Finnsheep for the main traits used in the multi-line selection. The magnitude of the heritabilities and genetic correlations demonstrate that the applied selection criteria in the lines have resulted in an improvement for most of the traits. Genetic parameters indicated that simultaneous improvement of growth and fleece characteristics can be achieved. Prolificacy remained stable across the years. Genetic improvement for lamb live weight increased with age, without changing birth weight and mature ewe live weight. The trends for lamb live weight showed a slightly larger response in the meat line, as expected. The results from live animals and processed skins support previous findings that Finnsheep has some desirable fleece characteristics, which can be improved by intensive selection. The main selection objective for Finnsheep will be meat qualities in the near future. Annual response for meat qualities has been estimated to be 3 to 5%, supposing the possible high selection intensity in Finnsheep. A 3-year field study has already started for development of a recording scheme and a breeding programme for meat traits.

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Fibre and Meat in Norwegian dairy goats

Summary by Claire Souchet

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From the paper "The economics of fibre and meat on Norwegian dairy goats", by L.J. Asheim[a], L.O. Eik[b]. [a]*Norwegian Agricultural Economics Research Institute, P. O. Box 8024, Dep., 0030 Oslo, Norway,* [b]*Dept. of Animal Science, Agricultural University of Norway, 1432 Ås, Norway.*
A full version of the paper is available in "Small Ruminant Research", 1998.

Norway is traditionally a country with a large number of dairy goats. However, it faces today an overproduction of goat's milk, due to a decrease in the sales of traditional Norwegian brown cheese. The recent development of a new spreadable white cheese, "Snøfrisk", requires a uniform milk supply throughout the year. Moreover, the meat market for kids is nearly non existent, although 75,000 kids are culled every year. It was also observed recently that Norwegian dairy goats produce a high quality undercoat of cashmere.
Considering these facts, a study was undertaken to investigate the possibility for Norwegian farms to combine the production of cashmere fibre, meat and milk.

Six dairy farms' accounts, on the 1989-1990 period, were used in the study. The six following alternative systems were studied:
a) Kidding in February; the basic system with cashmere fibre from dairy goats and their replacements.
b) Kidding in February; cashmere fibre from dairy goats and 11 month old kids before slaughter for meat production.
c) Kidding in February; cashmere fibre from dairy goats and 23 month old kids before slaughter for meat production.
d) Kidding in May; cashmere fibre from dairy goats and 8 month old kids before slaughter for meat production.
e) Kidding in May; cashmere fibre from dairy goats and 20 month old kids for meat production.
f) Kidding in December; cashmere fibre from dairy goats and 13 month old kids for meat production.

Managements issues which might arise from these systems, such as use of pasture, reduction in milk production, supplementary feeding, cashmere production, market prices and extra labour, were considered in determining the feasibility of the alternative systems and their profitability.

The main observations were as follows:
-adding cashmere production to the traditional system could increase the farm income.
-kidding in May and slaughtering at 8 months or 20 months of age (alternative systems d) & e)) could yield the best economic return. However, the b) alternative, kidding in February and slaughtering at 11 months of age, also appeared to be profitable.
-goats with a double coat could resist better the harsh Norwegian environment. So, even if the cashmere was not harvested, these double coated goats would be of value to the farmer.

It was concluded that the combined production of cashmere, milk and meat for Norwegian goats was a feasible option. If successfully demonstrated, this could encourage Norwegian farmers to transfer from the traditional but less lucrative system of dairy goat husbandry.

Goat production - a growing niche in Denmark

by Annette Holmenlund
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The Danish Goat production is increasing. Eight hundred and seventy three herds with 7,313 breeding nanny goats were registered in the Central Livestock Register at the end of 1997. This constitutes an increase of about 20% since last year. The number of meat producing goats is rapidly increasing but production is still at an early stage of development .

Farm shops sell mohair

Mohair production in Denmark is a well established and organised speciality production, with a volume of approximately 12 tonnes in 1997. The organisation of mohair producers has grown since 1994; almost the entire Danish production is now supplied to the company owned by the producers, *Dansk Naturfiber a.m.b.a.* This company takes care of grading and processing, in textile mills based in England and Denmark, as well as distributing the finished goods to Danish farm shops.

The finished goods are stockings, plaid and knitting yarn, as well as professionally designed knitwear, sweaters, skirts, vests, hats and scarves. Dansk Naturfiber expects 22 organisation farm shops to turn over mohair goods worth approximately DKK 10 million in 1997. This corresponds roughly to US $ 1.5 million.

Steady sales at good prices

In the early 1990's, production of mohair involved some financial problems but with the organisation of Dansk Naturfiber, sales have increased and the prices are steady. The greatest earnings come from the sale of specialised luxury products at the farm shops. Consequently, we expect the future mohair production in Denmark to increase to approximately 20 tonnes a year, and that more professional farm shops will be established.

National and International breeding work

Maintaining the high health standard of Danish goats is very important . Importation of breeding animals is therefore very limited, and as a result, the mohair yield of Danish goats is not as high as in other countries. A controlled import of embryos from South Africa and Texas will increase the yield of the Danish population, which originates primarily from New Zealand's Asian types.

The organisation of the Angora Goat breeding in highly developed in Denmark. The National Department of Danish Cattle Husbandry calculates breeding indexes with an Animal Model. This is based on records of, for example, mohair yield, quality and fertility in 133 Angora goat herds, with a total of 1,000 nanny goats. The aim is to maintain the quality of breeding work; this is achieved through the participation of the majority of the herds in the Goat Registration Programme, which allows the collection of production data to continue. International co-operation on joint data collection and breeding value assessment of Angora Goats is under way.

Increase in Goat milk production

The company *Dansk Gedemaelk Transport a.m.b.a.* collects goat milk from 31 herds and buys the majority of the goat milk produced in Denmark. The milk is transported to Ørum Sogns Mejeri.

The dairy received 1,000 tonnes of conventional goat milk and paid DKK 3.40 per kg ECM in 1997. The milk production has increased by 200 tonnes a year, in recent years. Four organic goat herds supply a total of 140 tonnes of milk, at a price of about DKK 4 per kg ECM.

Goat cheese for export

The conventional milk is processed into approximately 80 tonnes of ultra-filtrated goat feta, and some is used in a mixed product of cow milk, goat milk and vegetable fat. Both the feta and the mixed product are exported. The dairy uses the organic milk for producing white mould cheese, hard cheese, soft cheese, feta and concentrated yoghurt.

Pure Danish Goat cheeses require strong marketing, because of the tough competition with France for the production of "handmade" cheeses. The Ørum Sogns Mejeri expects the export of the mixed product to increase, safeguarding producer's sales of goat milk.

The price paid to producers of goat milk is 40% higher than for cow milk, and the organised sale results in more, and larger, goat herds.

Milk recording will be improved

In 1997, five herds participate in the milk recording scheme, with a total of 426 goats (annual average). The average yield is 611 kg milk with 4.09% fat, 3.52% protein and 46 kg fat+protein per goat. This is slightly lower than in 1996. The milk recording system will be improved in 1998, by being integrated with the Database for Goat Registration. This will give a better basis for calculating breeding values. The National Department of Danish Cattle Husbandry expects more herds to participate in the milk recording scheme, and to use its results for achieving genetic progress in milk yield.

Decentralised advice

The National Department of Danish Cattle Husbandry provides advice to goat producers. The aim is to establish a decentralised advisory service that provides advice on feeding, breeding and production. The producers want to establish pilot farms which can generate more data on production under Danish conditions.

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Fine Fibre Production in High Mountain and Trans-Himalayan Region of Nepal

by Chet Raj Upreti, Senior Scientist
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The Chyangra is a Mountain Goat (*Capra hircus*) mostly reared for meat, fine fibre and as a pack animal. They are reared at an altitude of 2400 m and managed under a transhumance system.

Nepal has 57,831 Chyangra goats (1% of the total goat population in Nepal), producing a total of 8.67 tonnes of fine fibre. The fine fibre production varies from 50 to 200 grams per goat per year, with an average of 150 grams. The shearing is done once a year during the summer (May to June). Down fibre, known locally as Pashmina, has a diameter of 10 to 15 microns.

Chyangra fibre (Pashmina) is blended with Angora rabbit fibre to make high quality shawls. The fibre is collected from the remote areas of Nepal and Tibet, for spinning and weaving in Kathmandu. The purchase of this fibre is confined to a specific group of people in Kathmandu. The high quality shawls are exported to Arab and European countries, at an average price of US $ 200 per shawl. A hand made quality shawl costs up to US $ 500.

Chyangra fibre has been traditionally used for the hand made shawls. However, studies showed that it would be possible to improve both fibre quality and fibre use, with a little effort from the goats' producers and the weavers.

Downy Goats in Kazakstan

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The Kazak goat population

Since olden times people in Kazakstan have bred the so called 'Kazak goats' for meat, milk, skins and rough wool. Their colour was mainly black (80% of goats) and they produced a kid crop of 115-130%.

The number of goats in Kazakstan since 1916 is shown in Table 1.

Table 1. Numbers of goats in Kazakstan

Year	Number of goats (thousands)
1916	2101
1928	3752
1941	1145
1951	2744
1990	983
1997	800 (approx.)

In 1951, 18,000 tonnes of meat, 2,000 tonnes of rough wool, 70 tonnes of down and over 720,000 tonnes of goatskins were produced. The reduction in the number of goats is related to a reduction in the price for goat products, which has led to a reduction in the production of down and also mohair from Angora goats.

From 1990-1995, 50-60 tonnes of mohair and 2-3 tonnes of down were produced annually in state-owned farms. Since 1995 the goats in the state-owned sector of the Republic have been transferred to the private sector and, as a result, most goats are now owned privately.

Currently there are no official statistics on the fibre production from goats, but according to our estimates, about 3-5 tonnes of down are produced annually in Western Kazakstan. There are no state purchases of down in any other part of Kazakstan.

The number of goats that can produce down (local Kazak goats) is at present 600,000, or 75% of the total goat population. Thus, at an average production of 100g of down per goat, Kazakstan has the potential to produce 60 tonnes of down annually. The remainder of the goats (200,000) are Angora goats of the Soviet Mohair breed.

Down production by local Kazak goats

The live weight and down production of local Kazak goats is given in Table 2.

Table 2. Live weight, down weight and down length of local Kazak goats

Sex	Age (years)	Number	Live weight(kg)	Down weight(g)	Down length (cm)
Western Kazakstan					
Male	3	3	66.0 ± 2.87	280 ± 40	6.00 ± 0.7
	2	28	-	253 ± 13	5.58 ± 0.21
	1	34	29.7 ± 0.58	168 ± 7	5.16 ± 0.15
Female	3	169	36.3 ± 0.11	199 ± 30	5.10 ± 0.4
	2	24	-	217 ± 11	4.75 ± 0.4
	1	12	27.2 ± 0.47	145 ± 6	4.68 ± 0.18
South-Eastern Kazakstan					
Female	3	190	39.5 ± 0.38	137 ± 5.7	6.70 ± 0.24
	1	22	29.4 ± 0.38	94 ± 7.8	5.50 ± 0.04

Down fibre diameter of local Kazak goats is 16.48 - 20.70 mm, with a coefficient of variation of 11.26 - 29.25% (Table 3). Down content of the fleece is 23.63 - 36.50% with the percentage of rough fibres with a diameter of over 30 mm being 69.50 - 72.76% (Table 3).

Table 3. Down fibre diameter and down content of local Kazak goats

Sex	Age (years)	Number	Down Diameter (microns)	C.V. (%)	Down yield (%)
Male	3	10	20.70 ± 0.17	29.25	36.5
Female	3	10	19.48 ± 0.16	18.30	32.20
	1	10	16.48 ± 0.20	11.26	23.63

Breeding to increase down production

In Western Kazakstan, selection work to increase down weight is being conducted by crossing local Kazak goats with the Pridon, Gorni Altai and Orenburg breeds from Russia. As a result, the production of down from crossbred goats is significantly increased, in comparison with local goats (Table 4).

Crossbred goats had increased fibre diameter and a higher down content in the fleece in comparison with local Kazak goats (Table 5).

The increase in down yield is related to an increase in follicle density and an increase in the ratio of secondary to primary follicles, in comparison to local Kazak goats (Table 6).

Table 4. Live weight, weight and length of down of crossbred (first generation) goats

Crossbred	Age (years)	Number	Live weight (kg)	Down weight (g)	Down length (cm)
Kazak x Pridon	1	12	30.95 ± 0.46	266 ± 6.7	7.38 ± 0.18
	2	33	-	396 ± 17.5	7.70 ± 0.17
Kazak x Gorno Altai	1	12	30.24 ± 0.25	249 ± 3.8	7.44 ± 0.14
	2	24	-	329 ± 10.1	7.73 ± 0.16
Kazak x Orenburg	1	30	28.22 ± 0.45	214 ± 8.9	4.57 ± 0.20
	2	24	-	256 ± 20.3	4.88 ± 0.22

Table 5. Down diameter and content of crossbred goats

Crossbred	Number	Down Diameter (microns)	C.V. (%)	Down yield (%)
Kazak x Pridon	10	19.90 ± 0.16	24.04	64.25
Kazak x Gorno Altai	10	18.85 ± 0.16	25.57	60.73
Kazak x Orenburg	10	17.28 ± 0.15	26.73	46.55

Table 6. Follicle density and ratio of secondary to primary follicles (S/P ratio) in crossbred and local Kazak goats

Genotype	Age(months)	Follicle density (number/mm²)	S/P ratio
Kazak x Pridon	4	30.61 ± 2.52	6.61 ± 0.29
Kazak x Gorno Altai	4	30.62 ± 3.24	6.53 ± 0.40
Kazak x Orenburg	4	25.32 ± 3.75	5.45 ± 0.21
Kazak	4	25.28 ± 4.36	5.23 ± 0.34
Kazak x Pridon	12	40.48 ± 3.13	4.87 ± 0.51
Kazak x Gorno Altai	12	37.86 ± 2.80	4.68 ± 0.68
Kazak x Orenburg	12	37.27 ± 1.71	4.34 ± 0.18
Kazak	12	36.69 ± 1.75	4.42 ± 0.76

A flock of about 2000 down-producing goats has been established at 'Almazay Farm', in Western Kazakstan, using these crossbred goats. The average weight of down produced is 320g with a diameter of 18-20 mm. The colour of the down is grey and dark grey. Selection of goats is aimed at reducing the diameter of the down.

In Kazakstan, there is the possibility of producing white down from first generation crossbred goats by crossing local Kazak goats with male Angora goats (Soviet Mohair breed). Similar crossbreds are bred in significant numbers in the South-East of Kazakstan. According to our investigations, down weight of these goats at three years old is 216 ± 7.2g and of yearlings 125 ± 5.2g per head. Fibre diameter of down from yearling crossbreds is 17.70 ± 0.10 mm, with a coefficient of variations of 26.61% and a down length of 8.32 ± 0.06 cm.

In mountain areas the average flock size is 300-350, while in other areas in the Republic it is 400-500 head. Mating occurs in November and December, with kidding in March and April. Down is harvested by combing in February in Western Kazakstan and in March in South-Eastern Kazakstan.

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Workshops

The next EFFN workshop will be held in Aachen, Germany, on the 4-5 September 1998. The discussions will be on "*Quality assessment and the requirements of the fibre manufacturing industry*". Unlike the two first workshops, this one will be mainly addressed to fibre manufacturers.
A report of the discussions will be available later this year.

The reports on the two first EFFN workshops, one on "*Development of European standards for the objective measurement of genetic selection parameters, based on quantity and quality fibres traits*", the second on "*Establishment of common European protocols for the recording of genetic performance data for speciality fibre producing animals*" are now published and available.

If you wish to receive these reports, contact the project administrator, Ms Claire Souchet.

2nd EFFN Workshop in Castres (France)

by Claire Souchet
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The second EFFN workshop, "*Establishment of common European protocols for the recording of genetic performance data for speciality fibre producing animals*" was held in Castres (France), in March 1998. It was hosted by Dr Daniel Allain (Institut National de la Recherche Agronomique, Station d'Amélioration Génétique des Animaux, Toulouse).
The purpose of this workshop was essentially to pursue the discussions started in Spain, last October. Priority was given to the establishment of common European protocols for the recording of the parameters identified previously.

Papers on the genetic basis for selection and breeding schemes in Europe were presented. Dr Stephen Bishop, from the Roslin Institute in Edinburgh (Scotland) presented the Scottish cashmere goat selection scheme, followed by Dr Daniel Allain's presentations, on French Angora rabbits and goats selection programmes. Finally, Ms Annette Holmenlund, from the Danish Agricultural Advisory Centre in Aarhus N, presented the Danish system for Angora goats selection and recording schemes.

Participants separated into four discussion groups, on fine wool, cashmere, angora and mohair fibre type. For Cashmere**,** the traits to be measured were finalised and the database structure established. Four tables will be designed, including the three main types of traits and additional information concerning the animal itself. The implementation of such a database framework only requires a proper format to be agreed upon, its contents having been well defined. For Angora, the traits to be measured have been identified and finalised. Recording protocols have been identified, as a common recording card for the three principal countries. Database framework has not been yet finalised, but the recording card system should be a prior step to such implementation. As far as the Fine Wool is concerned, the measurements used for selection indices have been finalised and information to be included within a database has been identified and agreed upon. It concerns animal identity information and production data. The final format of the database has to be defined. Finally, for Mohair, the database structure has been agreed upon. Five tables will be designed, concerning the animal identification, the fleece weight, the fleece assessment, the fibre test and the reproduction data. The final format for the database and implementation details only require to be finalised.

Two field trips enlightened the two days' discussions. The first was a visit to the Angora buck-testing station, situated near Castres. Mr André Billant described the aim of the station to the participants and the selection schemes and principles of the running of the station were explained. The group also visited the Sica Mohair, a processors' association. There, participants had the opportunities to see how the raw mohair from the breeders is sorted and graded, before being processed and marketed under a common label "Le mohair des fermes de France".

Mr Billant, presenting one of the Angora buck of the station.

Sorting and grading of the mohair fibre.

MACAULAY ANIMAL FIBRE EVALUATION LABORATORY

Fibre testing prices

	For 10 or more samples	*For less than 10 samples*
Fibre diameter	£5.00 per sample	£5.50 per sample
Fibre diameter and yield	£10.00 per sample	£11.00 per sample

Samples of **at least 1 g** should be sent to:
Hilary Redden, Macaulay Research and Consultancy Services Ltd,
Craigiebuckler, Aberdeen, AB15 8QH, Scotland, UK. Tel: (+44) 1224 318611

NB: If taken from a live animal, samples should be taken from the mid-side position, and if from a fleece, should be representative of the whole fleece.

All prices are subject to VAT at 17.5%. Please make cheque payable to MRCS Ltd.

Training courses/technical exchange visits

The Network has funds for the provision of a limited number of training visits by Network members -- or their staff and students -- for the purpose of learning about measuring techniques, to institutions in other EC countries. These visits or courses are in the use of OFDA technology in research institutes, extension services, producers organisations and manufacturers. The grants are therefore intended for organisations, who are using OFDA methodology, to run courses and for visits by staff from organisations setting up the new technology in their organisations.

Proposals for funding should include:

1-date of the visits and the outline of the activities that are planned,

2-the full address of the institute(s) to be visited and the contact name(s) there,

3-a description of the applicant's background and current interests and what he/she hopes to gain from the visit,

4-a budget showing all the expenses that will be claimed. The appropriate APEX air fare may be claimed for international travel. Within the destination country, reasonable travel expenses may be claimed. A subsistance allowance to cover hotels and meals may be charged at a rate of up to 75 ECU per day, and

5-an acknowledgment from the host institution that they have been consulted and agree with the proposal.

Following the visit, a short report should be sent to the Project Co-ordinator.

Applications should be sent to "Dr John Milne, EU Project Co-ordinator, MLURI, Craigiebuckler, Aberdeen, AB15 8QH, Scotland, UK". They should arrive not later than 6 weeks before the proposed departure date.

Find us on the Web !

http://www.mluri.sari.ac.uk/~mi573/

Our site on the World Wide Web provides:

- Information about the project's activities and the partners involved
- Details and reports of the workshops to be held
- Details of the published newsletters
- Details of latest developments on ***What's new?*** page

Any suggestions for the design or content of this site are more than welcome, especially any addition to the ***Other Links on Fibre*** page!