# Is variability in fibre diameter distribution related to genetic gain on fineness in French Angora goats ?

**D. Allain[1] and P. Martin[2]**

[1]INRA, UMR1388 GenPhySE, CS52627, 31326 Castanet Tolosan Cedex, France

[2]CapgËnes, Agropole, 2135 Route de Chauvigny, 86550 Mignaloux Beauvoir, France

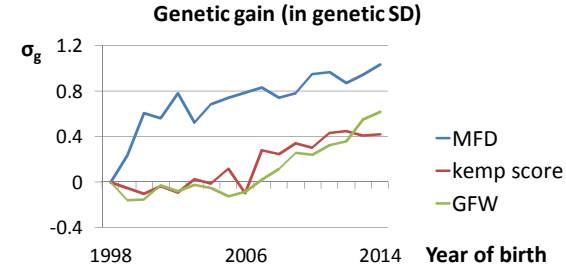
daniel.allain@toulouse.inra.fr

## Context

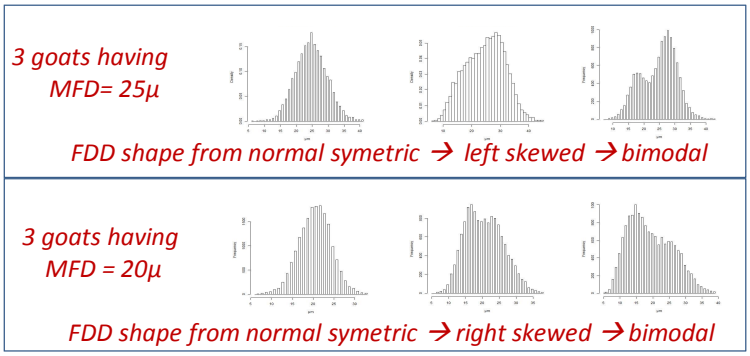
**National selection scheme of Angora goat in France**

An open nucleus (about 5 000 animals), a performance recording system with the following selection criteria : fleece weight (GFW) measured at 6 month interval at farm, kemp score assessed by expert and mean fibre diameter (MFD) with fibre diameter distribution (FDD) widely measured (from mid-side fleece samples) by OFDA methodology from 1999 (about 350 animals of 15-18 months of age / year).

### High genetic gain on mean fibre diameter but with high variability on fibre diameter distribution




*1.9µ phenotypic and 1 SD genetic gain on MFD*




## Material and methods

1- 5 429 fleece samples from 5 020 animals measured for MFD and FDD with OFDA methodology (OFDA2000) from 1999
2- Analysis of MFD and FDD parameters: CV, skewness and kurtosis (removed fibres > MFD+ 3SD) within fleece sample
3- Test for the presence of a mixture of normal distributions with unequal variance (R-Package Mclust) to estimate distribution parameters ( number, proportion, mean and variance of each population ) within the mixture distribution.
4- Genetic parameter estimates (VCE software) : 5 020 animals with performances (n=5429) ; 6 646 animals in pedigree file

## Results

### Genetic parameters* and phenotypic correlations* of MDF and FDD parameters

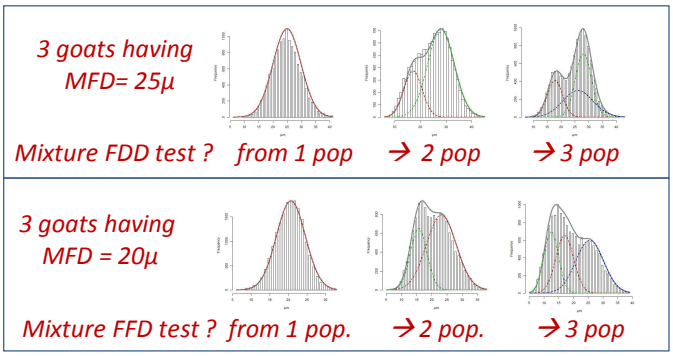
| | MFD | CV | Skew. | Kurt. | Nb. Pop. |
|---|---|---|---|---|---|
| MFD | **0.47** | -0.23 | **-0.40** | **0.36** | -0.14 |
| CV | -0.14 | **0.44** | **0.54** | **-0.90** | 0.27 |
| Skewness. | -0.31 | 0.48 | **0.36** | **-0.48** | -0.16 |
| Kurtosis | 0.25 | -0.73 | -0.33 | **0.37** | -0.11 |
| nbpop | -0.02 | 0.15 | -0.08 | -0.01 | **0.05** |

* Heritability on diagonal ; genetic and phenotypic correlations above and below diagonal respectively

High heritability estimates for MFD, CV, skewness and kurtosis
MFD is negatively correlated to CV, skewness and kurtosis,

- Selection to reduce MFD tends to increased skewness through positive skewed FFD

### Good fitting FDD density and mixture populations




85 % of FDD showed a mixture of fibre subpopulations :
68 % and 17% FDD showed 2 and 3 subpopulations respectively

## Conclusions

Preliminary results show that

- Genetic gain on MFD or selection to reduce MFD could negatively modify FDD parameters : by increasing FDD skewness and mixture of normal populations within a fleece and thus by increasing default spinning in mohair processing due to higher FDD heterogeneity.
- Both MFD and FDD parameters (CV, skewness, kurtosis) have to be taken into account in selection programmes in order to reduce both MFD and FDD heterogeneity.