Selecting milk composition and mastitis resistance by using a part lactation sampling design in French Manech red faced dairy sheep breed

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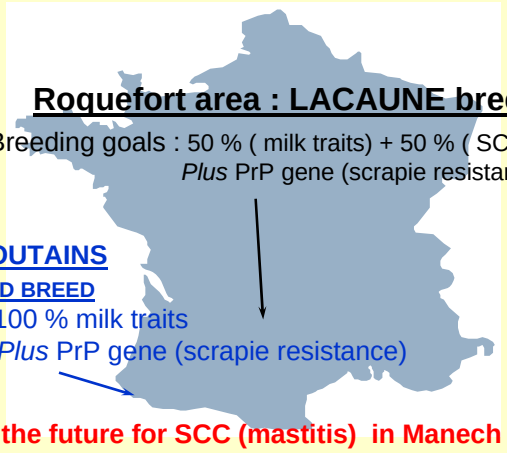
Génétique Animale

Breeding goals in French dairy sheep breeds



Roquefort area : LACAUNE breed

Breeding goals : 50 % (milk traits) + 50 % (SCC (mastitis) & udder)
Plus PrP gene (scrapie resistance)

PYRENEEAN MOUTAINS

MANECH RED FACED BREED

Breeding goals : 100 % milk traits
Plus PrP gene (scrapie resistance)

accounting in the future for SCC (mastitis) in Manech red faced breed

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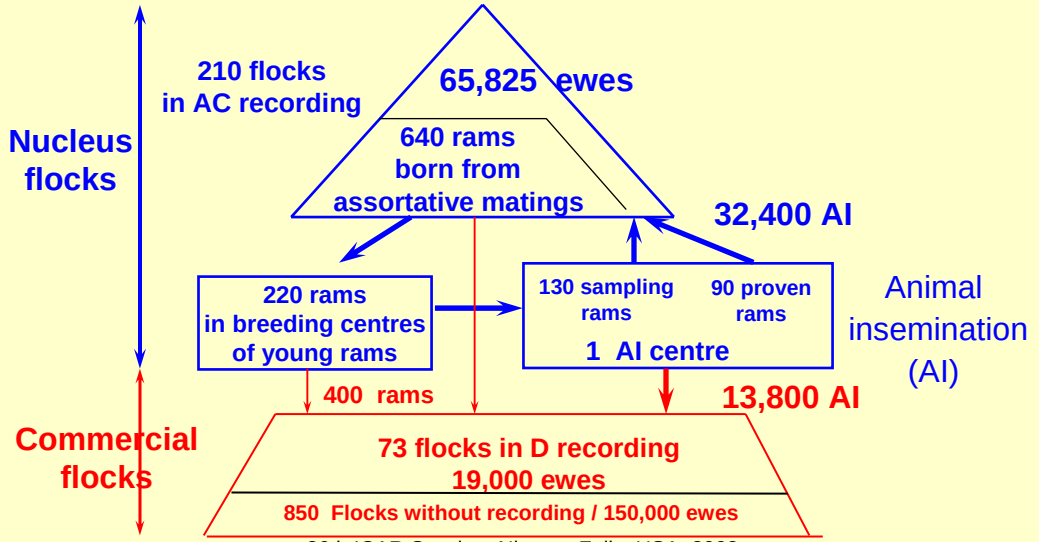
BREEDING SCHEME IN MANECH RED FACED (2001)



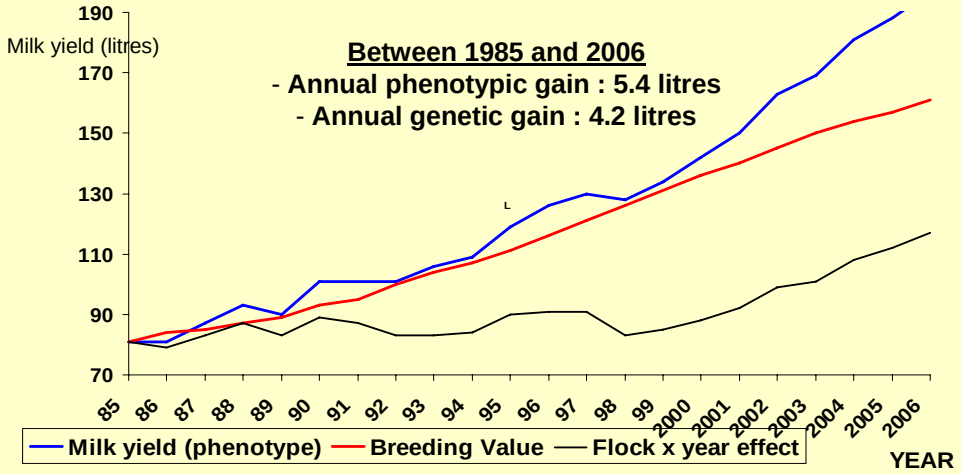
Published estimates of genetic trend for milk yield in dairy sheep (milk yield expressed as mature equivalent lactation)

(J.M. Astruc *et al.*, 2002; A. Carta *et al.*, 2004; A. Legarra *et al.*, 2003)

Country	Breed	Period	Annual genetic trend		AI rate in the nucleus flocks
			% population mean	in litres	
FRANCE	Lacaune	1986-1999	2.2 %	5.8 l	85 %
	Manech (Blond-faced)	1986-1999	2.3 %	4.2 l	54 %
ITALY	Sarda	1990-2002	1.2 %	2.0 l	12 %
SPAIN	Latxa (Blond-faced)	xxxx-2003		2.9 l	
	Latxa (Black-faced)	xxxx-2003		3.0 l	

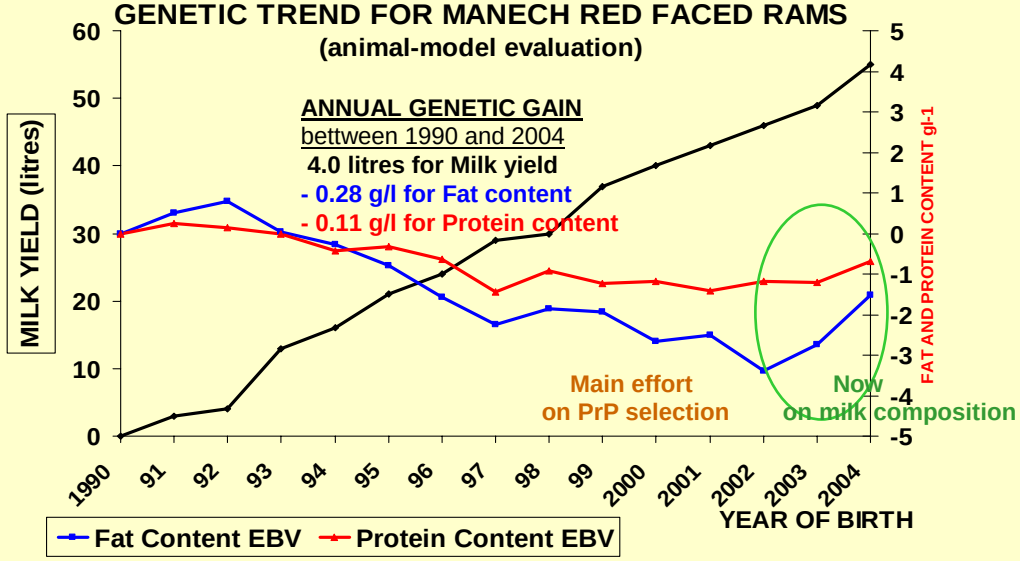
Phenotypic, genetic and environmental trends in Manech red faced breed for milk yield

(expressed in mature equivalent lactation)

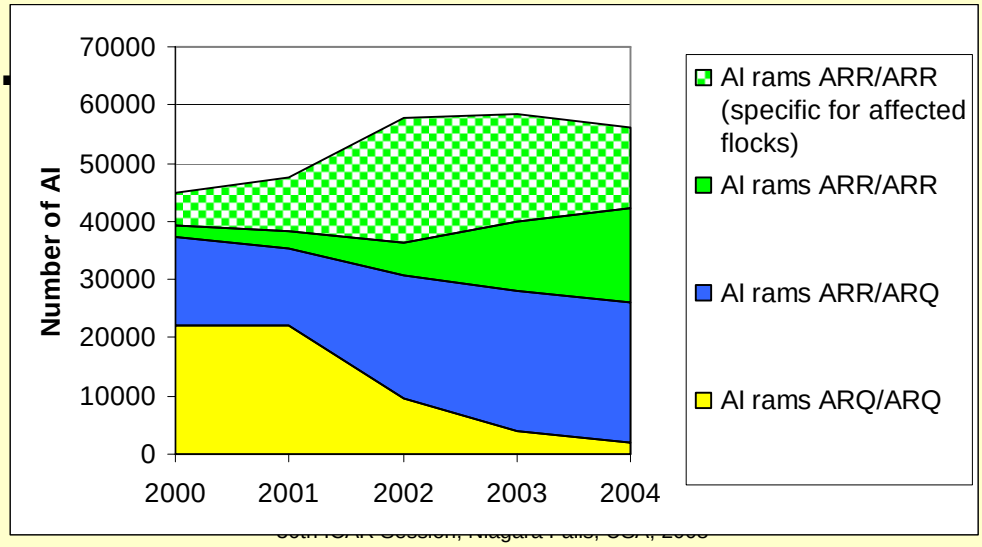


GENETIC TREND FOR MANECH RED FACED RAMS

(animal-model evaluation)



Evolution of the AI in Manech red faced breed according to the PrP genotype of the rams



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Milk composition and SCC recording (1/2)

- Part-lactation sampling design already used in Manech red faced (MRF) breed for milk composition: fat and protein contents

- Since 2002, part-lactation sampling design implemented in first lactation also for somatic cell count (SCC), i.e. assuming it is also relevant for SCC in MRF breed (despite no demonstrated in this breed compared to Lacaune for which is was done)

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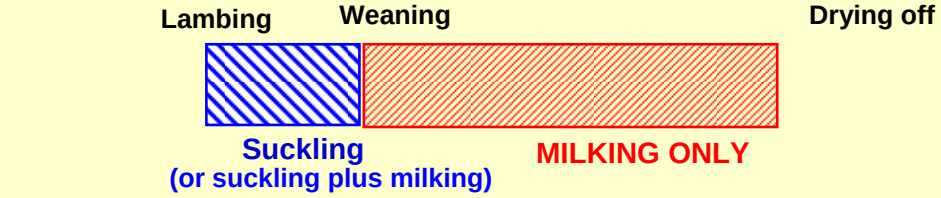
Milk composition and SCC recording (2/2)

- Part-lactation sampling design available now for SCC in MRF breed since 2002

- Are genetic parameters for milk traits and SCC (with such a simplified design) comparable in MRF breed and in Lacaune breed, i.e comparable in dairy sheep and dairy cattle ?

First simplification: AC design for milk yield



MONTHLY RECORDING OF MILK YIELD

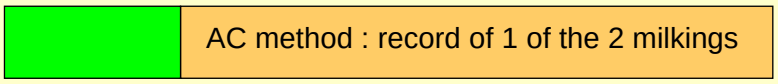
4.4 test day in MRF (in first lactation)

AC Method X X X X X **Milk yield**

(recording of one of the 2 daily milkings, example morning)

Part-lactation sampling design

Milk composition and SCC : part-lactation sampling within AC method for milk yield



Milk yield

Parities 1 X X X X X X

Sampling for FC, PC & SCC

part-lactation sampling with 2.8 test days on average (at the morning milking) for milk composition and SCC in MRF breed (first lactation)

Characteristics of the analysed MRF data

Characteristics	
Breed	Manech red faced
Study period	2002-2007
Animals in data (first lactation)	58,378
Animals in pedigree	118,313
Mean ± standard deviation of the traits	
Lactation number	first lactation
Length of milking period, d (after 30-d suckling period)	132 d ± 42
Milk yield, litre	149.2 l ± 63.1
Fat content, g/l (part lactation sampling)	61.1 g/l ± 8.8
Protein content, g/l (part lactation sampling)	47.8 g/l ± 3.9
Lactation SCS (LSCS) (part lactation sampling)	3.36 ± 1.38

Genetic parameters (Manech red faced breed)

	MY	FY	PY	FC	PC	LSCS
MILK yield	**0,33**	+0,87	+0,92	-0,39	-0,44	+0,21
FAT yield	+0,84	**0,28**	+0,91	+0,10	-0,16	+0,25
PROTEIN yield	+0,96	+0,82	**0,30**	-0,16	-0,06	+0,25
FAT content	-0,17	+0,34	-0,16	**0,28**	+0,60	+0,07
PROTEIN cont.	-0,34	-0,20	-0,04	+0,16	**0,51**	+0,07
LSCS	-0,26	-0,16	-0,17	+0,16	+0,38	**0,10**

Heritabilities on diagonal
Genetic correlations above the diagonal
Environmental correlations under

Genetic parameters
58,378 first lactations
between 2002 and 2007

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Genetic parameters : comparison **Lacaune** (121,283 first lactations) et **MRF** (58,378 first lactations)

	héritabilities	Genetic correlation with milk yield (MY)
Milk Yield	0,32 et 0,33	
Fat content	0,41 et 0,28	- 0,43 et - 0,39
Protein content	0,51 et 0,51	- 0,48 et - 0,44
LSCS	0,15 et 0,10	0,15 et 0.21

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Conclusion (1/2)

- Validation of the part-lactation sampling design for SCC in MRF breed as in Lacaune breed (comparable genetic parameters for milk traits and SCC)

- Genetic relationship between udder health (SCC) and milk production traits is antagonistic in dairy sheep as in dairy cattle (udder health will be deteriorated when selecting only milk traits)

Conclusion (2/2)

- the part-lactation sampling design is relevant both for milk composition and SCC selection in dairy sheep

- such a very simplified design (a very few test days recorded per ewe) needs to maintain relevant accuracy for each individual test day as presently defined in ICAR requirements for recording devices and for analytical quality analysis of sheep milk.

Thank you for your attention