



THE GLOBAL STANDARD
FOR LIVESTOCK DATA

How ICAR can help in fostering cooperation across countries in breeding programs: the case of the Latxa and Manech dairy sheep breeds

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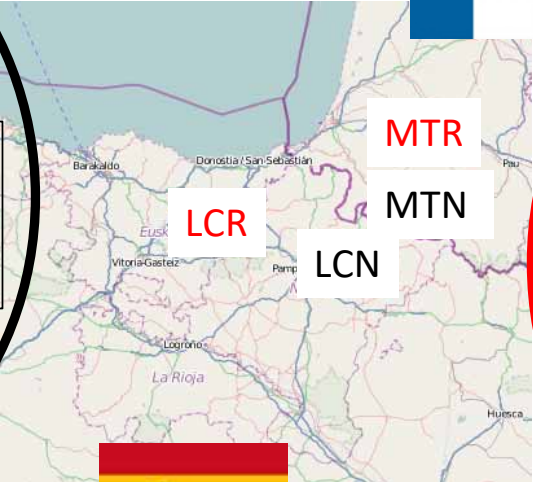


Manech and Latxa dairy sheep breeds: a close genetic background



MTN = Manech Tête Noire
LCN = Latxa Cara Negra

Basque country



MTR = Manech Tête Rousse
LCR = Latxa Cara Rubia

ARDI2 is a POCTEFA Interreg project (2024-26)

- ✓ Manech and Latxa: several collaborative projects over the last 20 years (R&D, breeding organisations).
- ✓ Bring closer the breeding programs of the homologous breeds.
- ✓ ARDI2 = wide scope of actions.

Exchanges between technicians and breeders

Strengthening genetic linkage (AI)

Modelling a common breeding program

Methane emission (through PAC and sniffers)

Across countries genomic evaluation

Standardisation of udder morphology

Valorisation of MIR spectra for milk fine components predictions

The ARDI2 project and ICAR services and network

Across countries
genomic
evaluation

Standardisation
of udder
morphology

Valorisation of MIR
spectra for milk fine
components
predictions

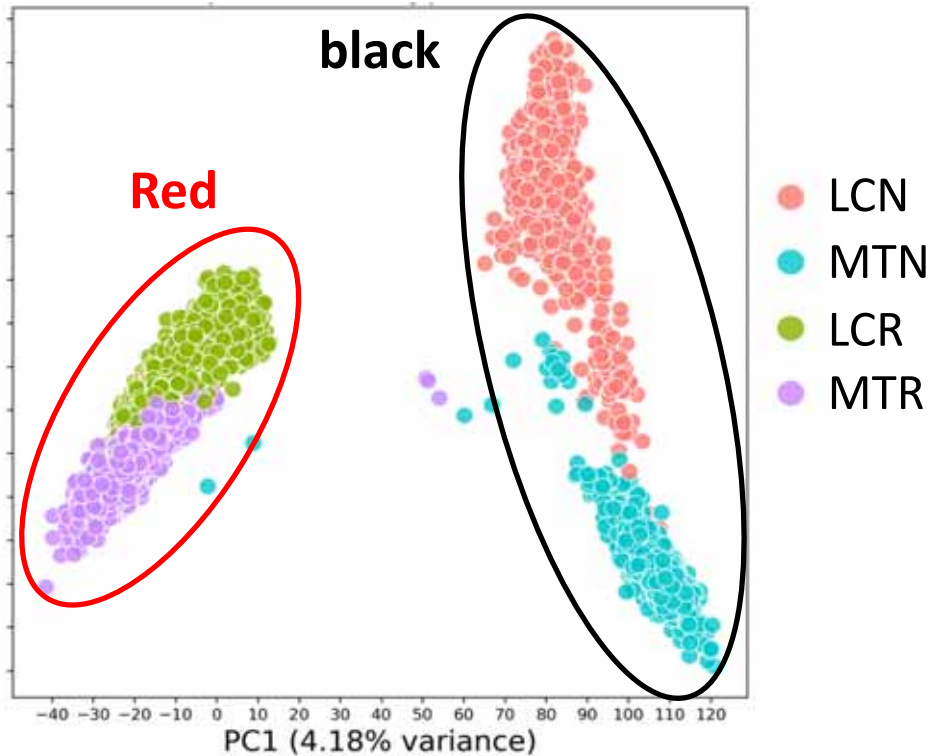
Many of the questions addressed in ARDI2 got part of the answers in ICAR/Interbull services, skills, tools.

This presentation aims at highlighting the input of ICAR/Interbull.

International genetic evaluation (1/3)

Good connectedness across
Manech and Latxa populations

PCA imputed genotypes (50K)



MTR & LCR

- # performances: 2 M in MTR & 0.5 M in LCR
- 561 genotyped males MTR with daughters with performances in LCR
- 213 with more than 10 daughters

MTN & LCN

- # performances: 0.4 M in MTN & 0.2 M in LCN
- 113 genotyped males MTN with daughters with performances in LCN
- 25 with more than 10 daughters

Unilateral exchanges (FRA => ESP)

Genotypes : Illumina in France, mainly Affymetrix in Spain

International genetic evaluation (2/3)

Adoption of an international ID similar to IB int'l ID

LCRESPF150030164688

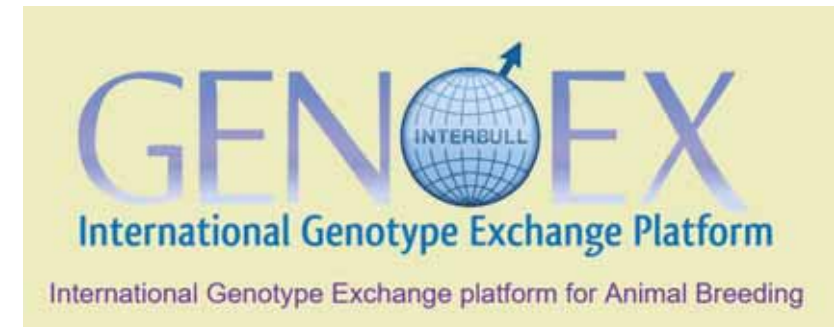
Exchange files format (pedigree, perf, parameters) close to the IB format

Subcontracting with Interbull to benefit from cattle tools / expertise on the genotype issue:

- Adaptation of GenoEx and IDEA to sheep to handle genotypes from different platforms and chips and provide aligned (according to the same reference map) and clean genotypes.
- Adaptation of the pipelines of InterGenomics to impute the genotypes and provide a file ready for the genomic evaluation.



Platform for genotype exchanges



IDEA Sheep database = platform for pedigree management



These tools, built/adapted within the project, may be useful for other breeds, other species.

International genetic evaluation (3/3)

- Using the genotype file produced by Interbull, the across country genomic evaluation is being implemented at INRAE Toulouse (joint work INRAE, IDELE, NEIKER).
- MY, FY, PY, FC, PC, 3 udder traits.
- Genetic correlation across countries: 0.8 ± 0.07 in black colour and 0.7 ± 0.03 in red colour

Animal Model ssGBLUP within "colour":

2 bi-traits models ("**ES red + FR red**" & "**ES black + FR black**")

trait (FR)
trait (ES)

$$y = X\beta + Z_u u + Z_p p + e$$

Fixed effects of
each country

Use of metafounders

Harmonisation of udder morphology (1/2)

Udder morphology has been scored for a decade in both populations

However, the traits were chosen differently across both populations and, when the same trait, scored in a slightly different way.

Manech	Latxa	Differences
Udder cleft		Not in Latxa
	Teat size	Not in Manech
Teat angle	Teat angle	Scores 1 and 9 reversed
Udder depth	Udder depth	Scores 1 and 9 reversed
Udder attachment	Udder attachment	=

Protocol to get equations of conversion between Manech & Latxa scales

4 scorers (2 Spanish and 2 French) scored the same flocks (5 in Spain, 3 in France) => Establish equations.

Allow to implement the across countries evaluation

Harmonisation of udder morphology (2/2)

- The issue encountered when merging udder scores from 2 populations highlights the interest to have guidelines on performance recording.
- Guidelines on udder traits should have been useful to avoid those issues.
- Guidelines on conformation traits in sheep are in progress (see Spehar et al, this Verona Conference) and should be released in 2026 (under the conformation WG and the SGC WG).
- Beyond udder traits, recommendations for harmonised recording of any (novel) traits is key.



Valorisation of MIR spectra (1/2)

Use of MIR spectra to predict fine milk components or complex traits: field of intense activity within ICAR.

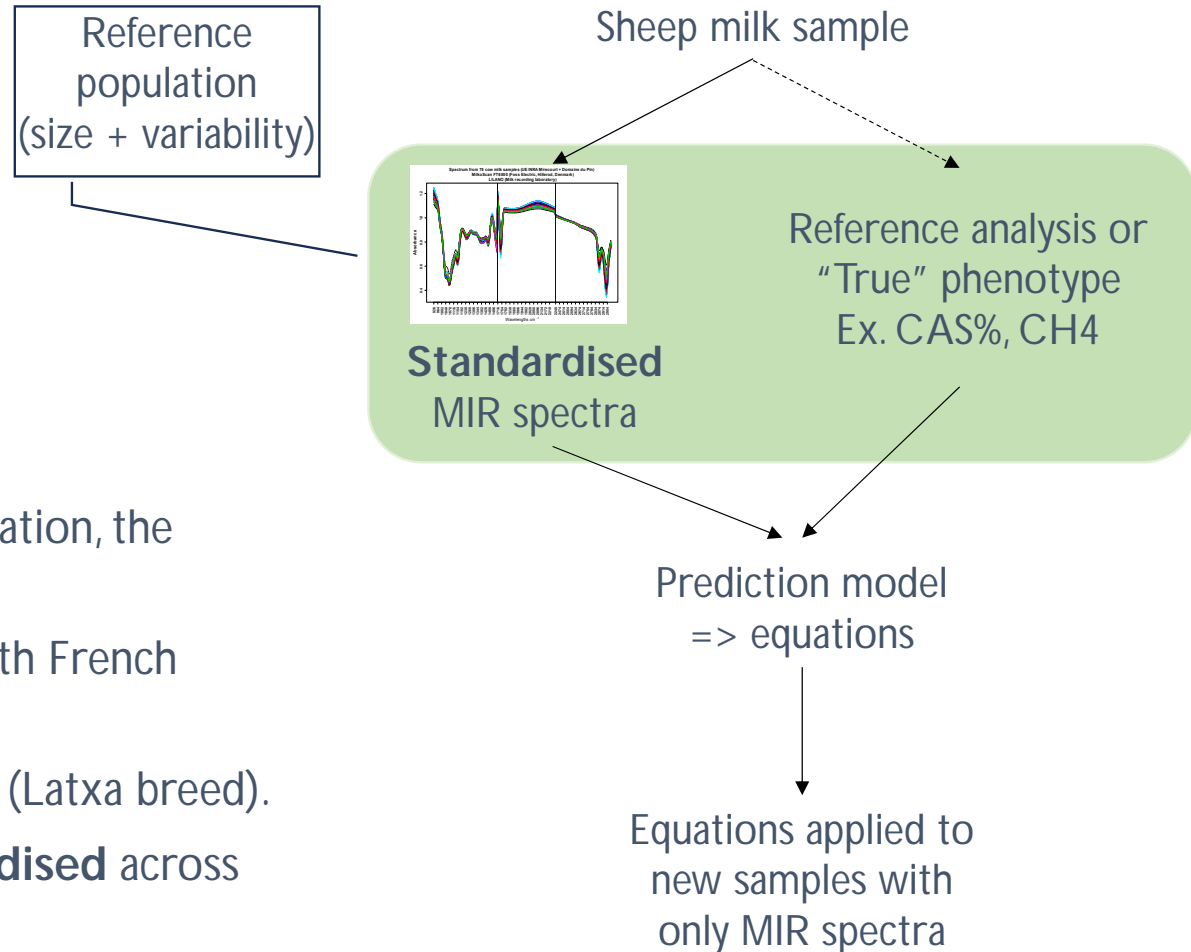
First in dairy cattle, but more and more in sheep and goats (see 3 presentations in this session).

The bigger and more diverse the reference population, the more accurate the predictions.

France started to build a reference population with French dairy sheep breeds.

ARDI2: extend the reference population to Spain (Latxa breed).

Our challenge: the MIR spectra must be **standardised** across analysers and in the time.



Valorisation of MIR spectra (2/2)

Input of ICAR in ARDI2

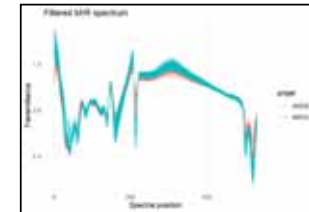
80 double samples were collected in 8 Latxa flocks (10 ewes per flock ; LCN and LCR in spring 2025)

- 1 sample analysed in routine in the milk analyses laboratory (ALVO, Navarra)
- 1 sample analysed in LEARTIKER for fatty acid profile (gas chromatography) and casein content (Kjeldahl)

Participation to the OPTIMIR network of reference milks, during the sampling period, in a research framework (organised by EMR and CRA-W) => coefficients of standardisation of MIR spectra

CRA-W: MIR spectra standardised ready for modelling

Equations of prediction in progress (IDELE), mixing data from several projects



Take home messages

ICAR is useful for breeding program within country (Guidelines, Services, Certificate of Quality). However, ICAR is even more useful when working across countries

- Harmonisation of traits (cf. udder traits) necessary for the international evaluation,
- Genomic evaluation: Interbull provides resourceful services (cf. GenoEx, evaluation pipeline),
- Network, new ideas (FA prediction from MIR spectra, ICAR Kuopio in 2006).

The current initiative towards building an EU Reference Centre in sheep and goats is a way to highlight the prerequisites and avoid mistakes, give countries the keys to enhance breeding programs and performance recording activities.

Thank you for your attention



**Interreg
POCTEFA**



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la contribution
financière du compte
d'affectation spéciale
développement
agricole et rural
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