



Relationship between somatic cell counts and other udder phenotypes in dairy sheep

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C N B L
Comité National
Brebis Laitières



THE GLOBAL STANDARD
FOR LIVESTOCK DATA
Annual Conference
ICAR2018.NZ

7 – 11 February 2018
Aotea Centre
Auckland,
New Zealand



Introduction

- In dairy sheep **intra mammary infections(IMI)** mainly consist on subclinical infections (acute mastitis < 5 %)
- **At individual level**, somatic cell counts are an accurate and indirect measure to predict subclinical IMI
- **At the flock level** : tank bulk SCC is a good indicator of the general health of the flock

- In France, **selection for mastitis resistance** based on SCC :
 - Lacaune breed since 2002, Pyrenean breeds since 2016
- Udder morphology included in the global merit index
 - in Lacaune breed for 12 years

Objectives

- Program (*Mamovicap*) dealing with tools for the control of mastitis based on the valorization of accessible information or phenotypes available in routine or with easy access
- Zoom on phenotyping “**chronic mastitis**” by **clinical examination** of the udder :
 - . Evaluation of its **on-farm feasibility**
 - . Relationship with the SCC at the flock or individual level
 - . Link with selection for mastitis resistance

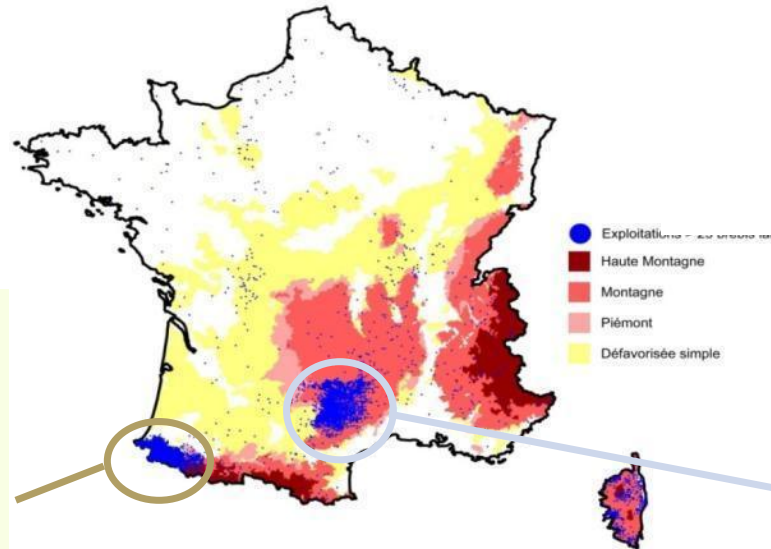
15 flocks involved in the study from 2 PDO cheese areas



PDO cheese



PDO cheese



Fonds cartographique Artique © tous droits réservés

Data collected on
7 065 ewes

Western Pyrenees

Red-Faced Manech

5 flocks

377 ewes/flock

228 liters in 157 days

Roquefort area

Lacaune

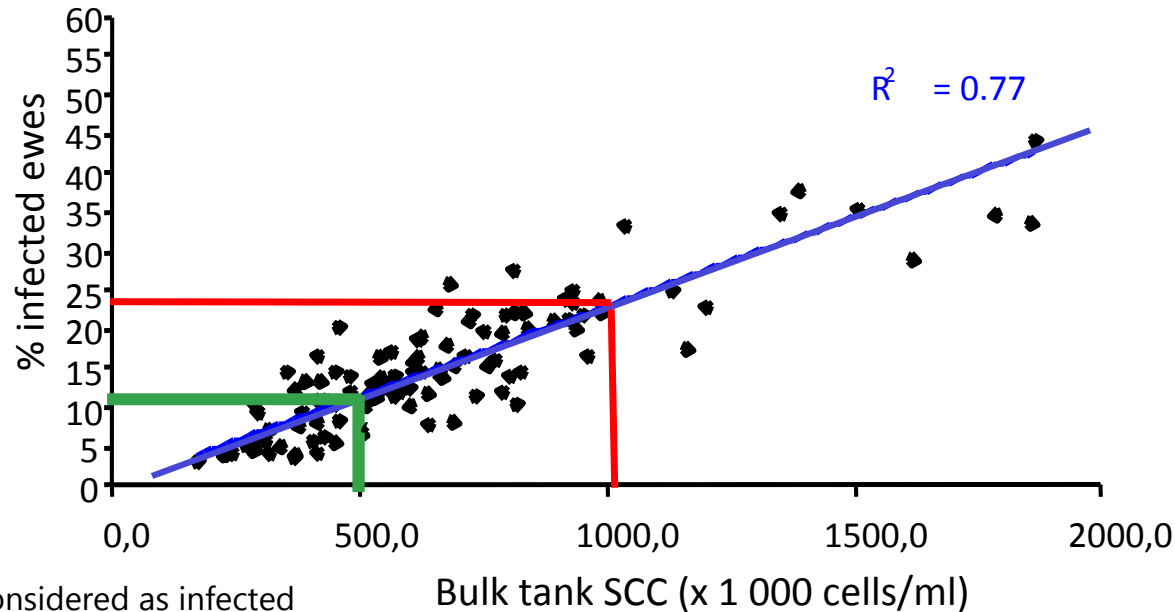
10 flocks

470 ewes/flock

277 liters in 165 days

Flocks involved in the study

- Flocks in **official milk recording** (nucleus of selection)
- For the 2 breeds : the « higher » bulk tank SCC possible in nucleus flocks breed



Ewes considered as infected if at least 2 individual SCC over 800 000 cells/ml

2 situations

- Roquefort area
Lacaune breed
498 000 cell/ml
- Western Pyrenees
Red-faced Manech
1 048 000 cell/ml

Berthelot *and al*, 2006

Udder clinical examination

- 2 operators (Vet School students)
- 2 times during lactation around the fourth and the seventh month of milking

- 5 traits scored :

- Udder asymmetry (5 levels)
- Size of the supra-mammary lymph nodes (6 levels)

- Parenchyma induration (6 levels)

- Abscesses (number and size)

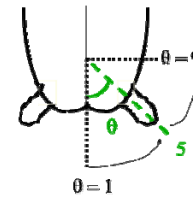
- Cysts (number and size)



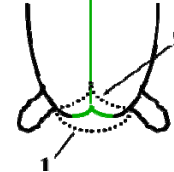
Udder morphology typology

- Based on traits included in selection
- Both suckling and machine milking abilities
- 8 types

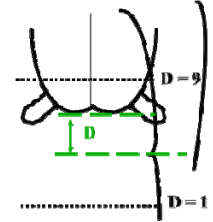
Teat angle



Udder cleft



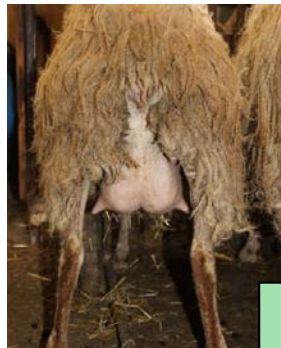
Udder depth



Barillet *and al*, 2006



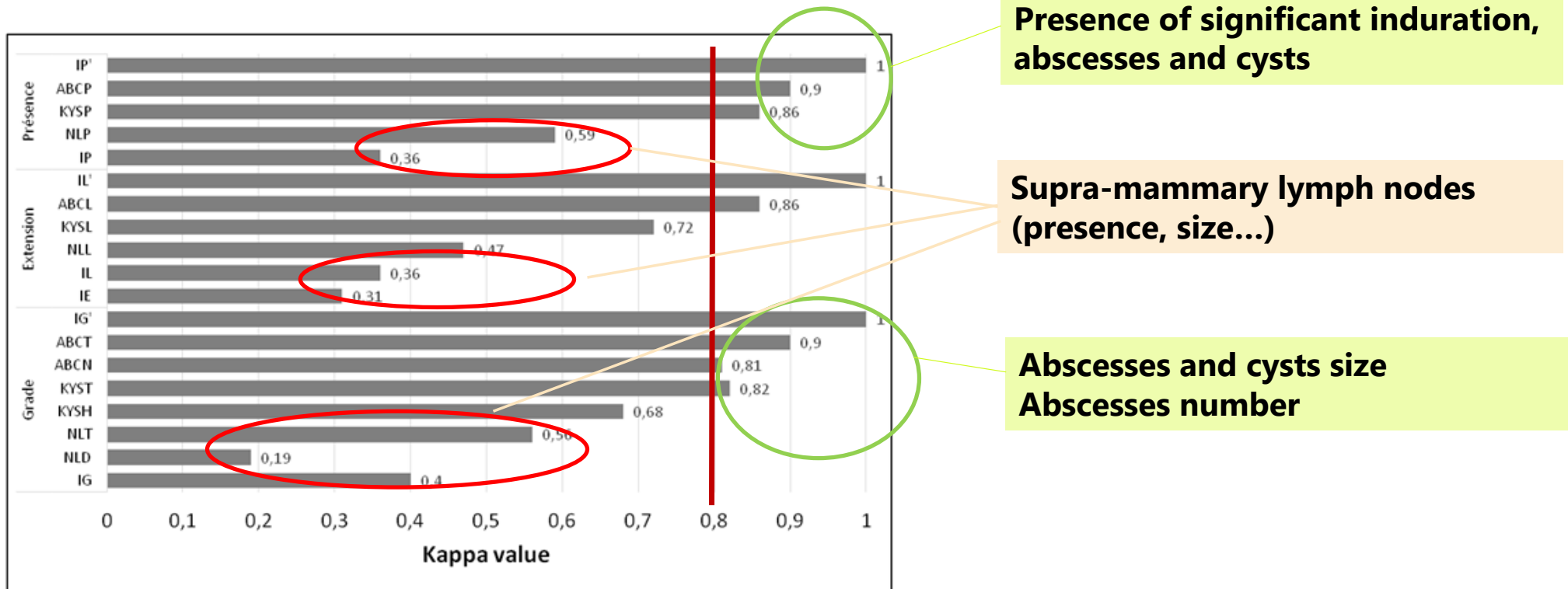
Type 1



Type
8

Operators concordance for clinical examination

- For 203 ewes (406 half-udders) in 2 flocks
- 2 examinations one after the other (repeatability) by each operator (reproducibility)



Présence of significant induration, abscesses and cysts

Supra-mammary lymph nodes (presence, size...)

**Abscesses and cysts size
Abscesses number**

Average percentage (intra-flock) of ewes with abnormalities (standard deviation)

	All flocks (N=15)	Roquefort area (N=10)	Pyr mountains (N=5)
% of infected ewes (SCC _i rule)	16 (8)	11 (3)	24 (10)
% of udder strong asymmetry	5 (3)	4 (3)	7 (2)
% of ewes with abscesses	11 (4)	9 (3)	14 (5)
% of ewes with cysts	22 (8)	19 (7)	26 (7)
% of ewes with udder induration	3 (2)	3 (1)	3 (2)
% of ewes with reactive nods	31 (9)	29 (9)	36 (9)
% of ewes with at least 2 abnorm.	23 (8)	19 (5)	31 (5)

Relationship between clinical examination and SCC

1. At the flock level (tank bulk SCC)

	Corr. with tank bulk SCC
% of infected ewes (SCC _i rule)	0.86
% of udder strong asymmetry	0.71
% of ewes with abscesses	0.74
% of ewes with cysts	0.61
% of ewes with udder induration	0.19
% of ewes with reactive nod s	0.32
% of ewes with at least 2 abnorm.	0.64

+ 100 000 cell/ml in the tank :

=> +3% « infected ewes »

=> But also more « chronic mastitis » : asymmetry, abscesses

Relationship between clinical examination and SCC

2. At individual level (individual LSCS)

Effect of ...

- Udder morphology,
- Udder asymmetry,
- Presence of abscesses
- Presence of cysts
- Presence of induration
- Presence of reactive nodules

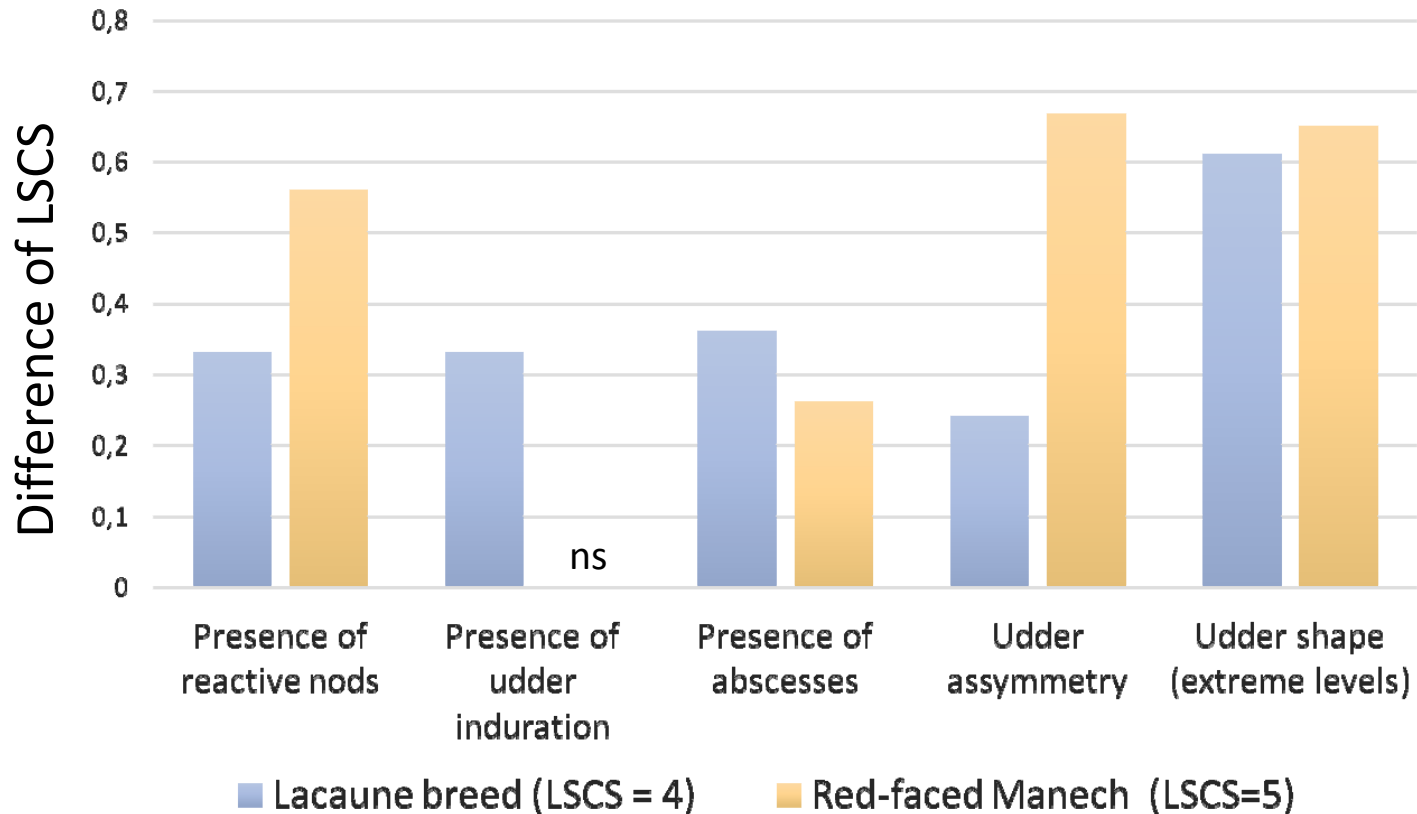
... on LSCS :

arithmetic mean of test-day somatic cell scores (log. transformation)

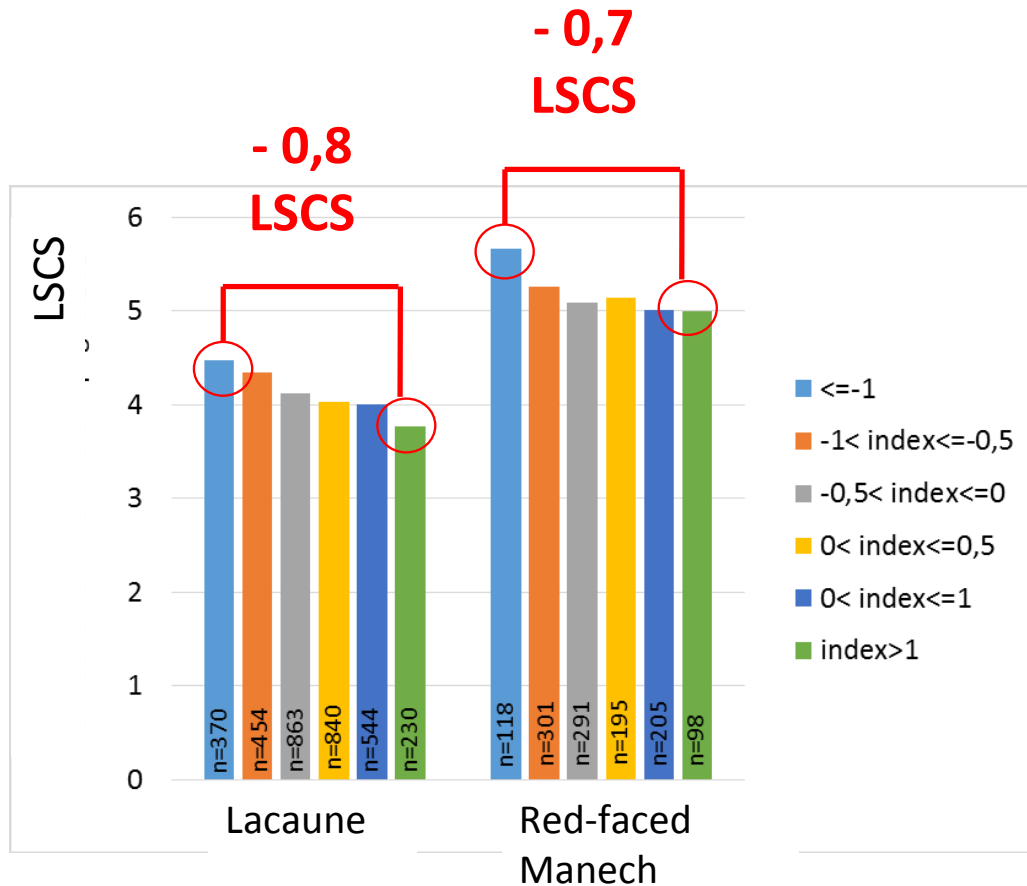
Other effects taken into account into the ANOVA :

Flock, parity, lactation stage at clinical examination, number of lambs

Effect on LSCS of the type of clinical abnormality, and of the udder shape



An illustration of the efficiency of SCC selection in French dairy sheep breeds



Daughters of proven rams :

. **less SCC** (-0,7 to -0,8 LSCS)

. but also **less abscesses**

Conclusion

- Possible on-farm to assess chronic IMI by clinical examination
- The most reliable and significant criteria are :
 - udder asymmetry,
 - abscess
- Good level of concordance between operators
- Adaptation of the clinical examination scoring to be made:
 - operators (breeder, technicians, vets)
 - objectives (culling, dry-off antibiotherapy or phenotyping)

Conclusion

- An illustration of efficiency of SCC selection in the 2 breeds
- Taking into account **both udder morphology and SCS** in the global merit index contributes in improving udder resistance to mastitis.
- Clinical examination allows **detection of chronic IMI** for mastitis control, and, potentially, in addition to SCS, a more complete phenotype for selection to mastitis resistance
- But it is necessary to take into account the feasibility (trained operators, time ...)

Remerciements



Acknowledgment

Mamovicap program was funded by the French Ministry of Agriculture

Thanks to the breeders, the vet students, the technicians...

