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► To cite this version:

Rachel Lefebvre, S. Barbey, Frédéric Launay, M. Gaborit, Luc Delaby, et al.. Association between udder health genomic breeding values and dairy and health traits in French cows. 74. Annual meeting of the european federation of animal science (EAAP), Aug 2023, Lyon, France. Wageningen Academic Publishers, Book of abstracts, 29, pp.415, 2023, Book of abstracts of the 74th annual meeting of the european federation of animal science. hal-04185002

HAL Id: hal-04185002

<https://hal.inrae.fr/hal-04185002v1>

Submitted on 22 Aug 2023

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Association between udder health genomic breeding values and dairy and health traits in French cows



Mastitis resistance = main health issue
 French Udder Health (UH) genomic estimated breeding value (gEBV) = combination of Clinical Mastitis (CM) and Somatic cell score (SCS) gEBVs



What is the impact of UH gEBV on dairy and health traits throughout the lactation?

Animals, Traits & Model



596 Holstein cows **341 Normande cows**
 1470 lactations from parity 1 to 4

$$y(\text{DIM}) = \text{date} + \text{DGV} + \text{WIL}_L(\text{parity}) + \alpha * \text{gUH} + \beta * \text{gUH} * \text{sd} + \gamma * \text{gUH} * \text{sd}^2 + \delta * \text{gUH} * \text{sd}^3 + \epsilon$$

Perf at each DIM Fixed effects Within parity (primi vs. multiparous)
 Wilink model of lactation curve:
 $a + b * \text{DIM} + c * e^{-0.06 * \text{DIM}}$

Impact of UH gEBV (gUH)
 $\text{sd} = (\text{DIM} - 125) / 250$

Milk yield (MY), fat (FC) and protein (PC) content and SCS within 250 DIM
 % of cows with CM within 100 DIM or metritis (MET) within 60 DIM, by 2-week period

Cows with UH gEBV $\geq +1.0$ = **RESISTANT** group
 ≤ -1.0 = **SENSIBLE** group
 (standard deviation, mean=0)

MY (kg)	28.2	18.1
FC (g/kg)	38.5	43.8
PC (g/kg)	31.5	33.7
SCS (point)	2.5	3.4
CM (%)	2.8	2.7
MET (%)	3.1	2.3

Impact of UH gEBV

PRODUCTION traits

HEALTH traits



Resistant cows produce **less milk** (total MY: -6% for Holstein cows and -13% for Normande cows) and barely **no difference in FC and PC**

Resistant cows have **lower SCS** (-1.5 pt, i.e. -80% cell count), **CM** (-5.2% for Holstein cows and -6.7% for Normande cows) and **MET** (-4.7 and -2.1%)

CONCLUSIONS

- ✓ Effects of UH gEBV agreed with the predictions, throughout lactation
- ✓ **NEW:** Metritis profiles were also impacted by UH gEBV

Genetic resistance to mastitis genetic resistance to metritis ? other health disorders...?