



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

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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?



Le Pin INRAE experimental facility (Normandy)



596 Holstein cows



341 Normande cows

1470 lactations from parity 1 to 4



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

Animals, Traits & Model

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

Perf at each DIM

Fixed effects

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

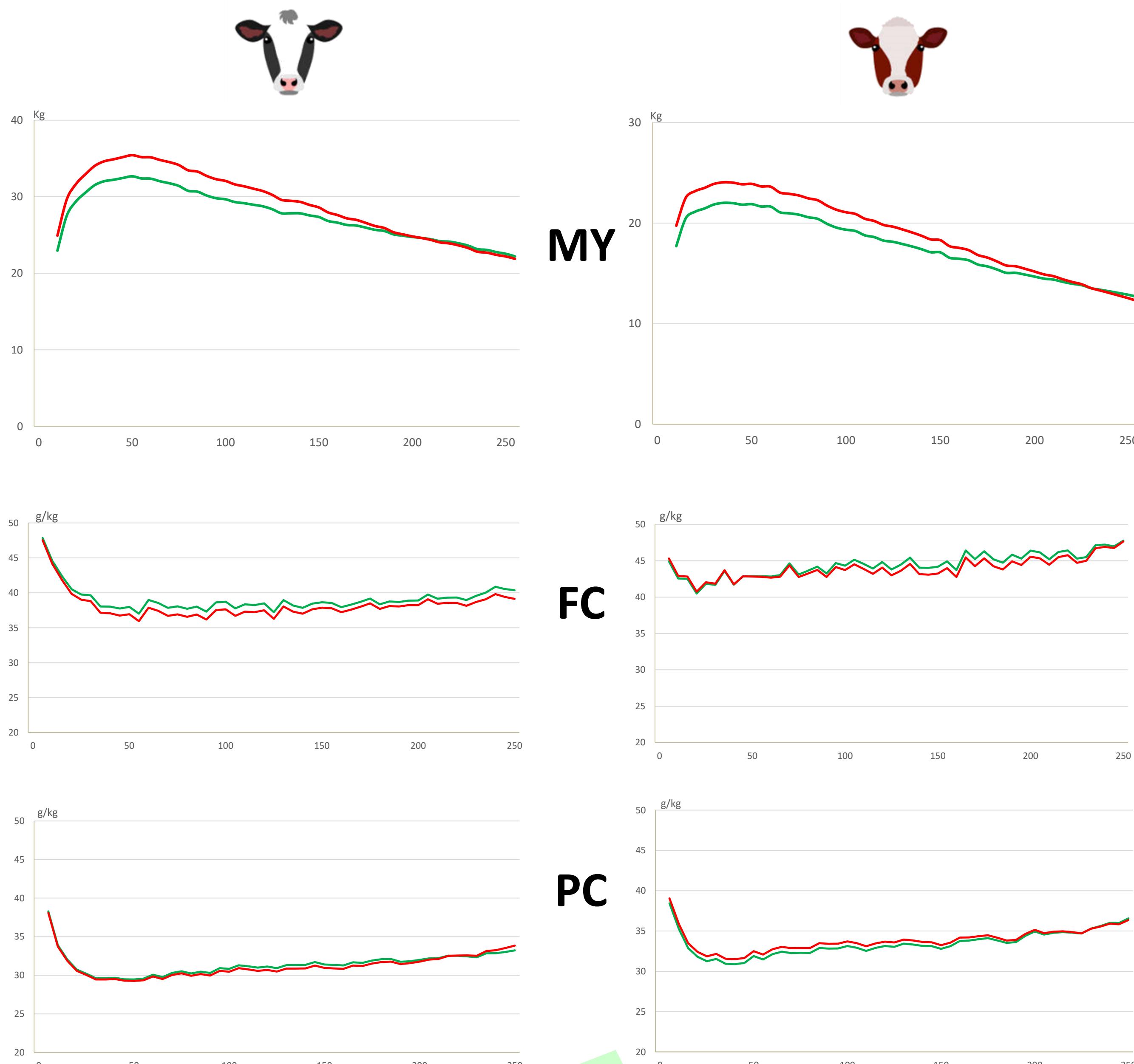
Impact of UH gEBV (gUH)
 $\text{sd} = (\text{DIM}-125)/250$

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

Mean performances

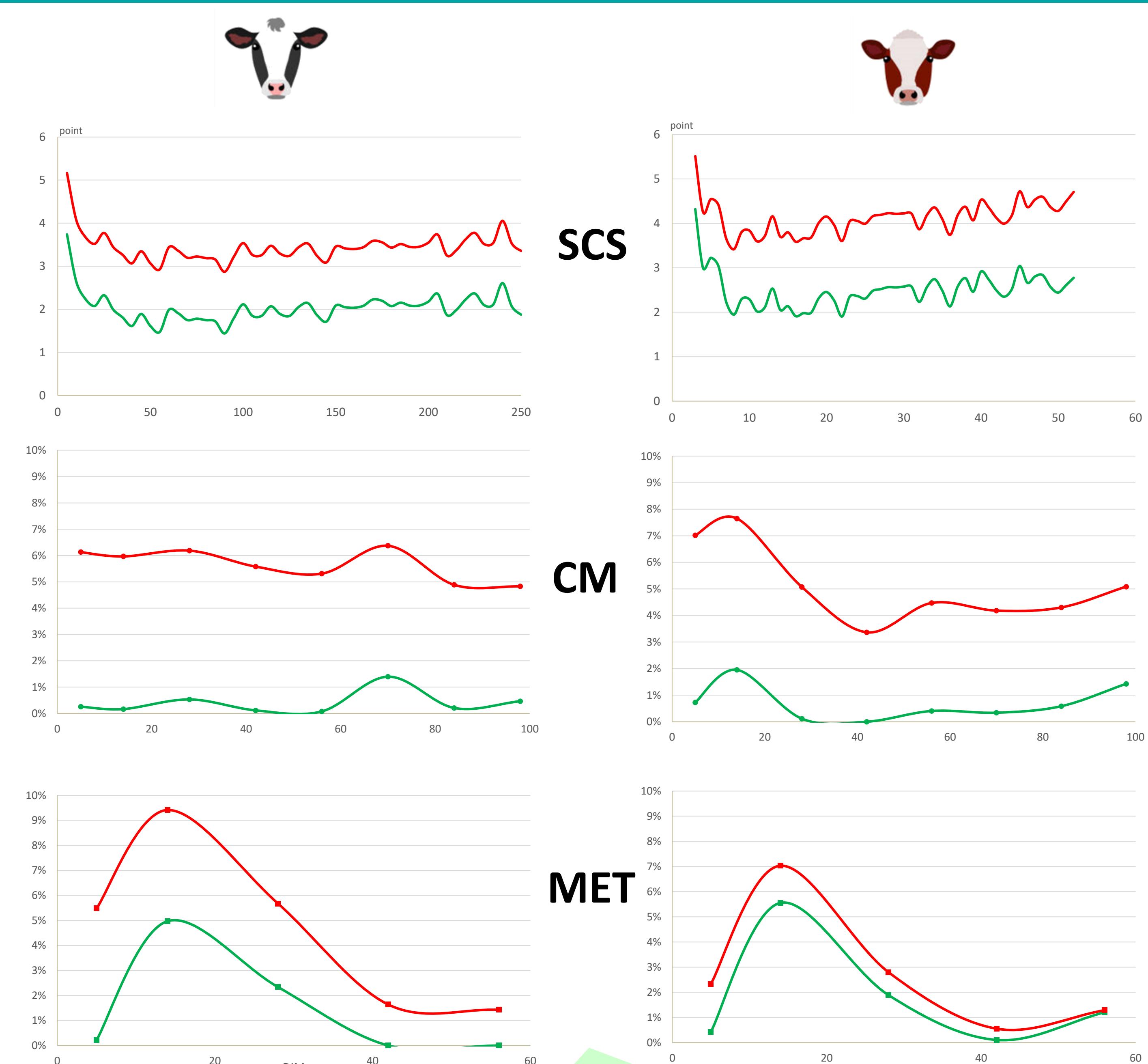
	Holstein cows	Normande cows
MY (kg)	28.2	18.1
FC (g/kg)	38.5	43.8
PC (g/kg)	31.5	33.7
SCS (point)	2.5	3.4
CM (%)	2.8	2.7
MET (%)	3.1	2.3

PRODUCTION 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

Impact of UH gEBV



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...?