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# A single-step genomic evaluation of maturing rate index in French beef breeds



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## INTRODUCTION

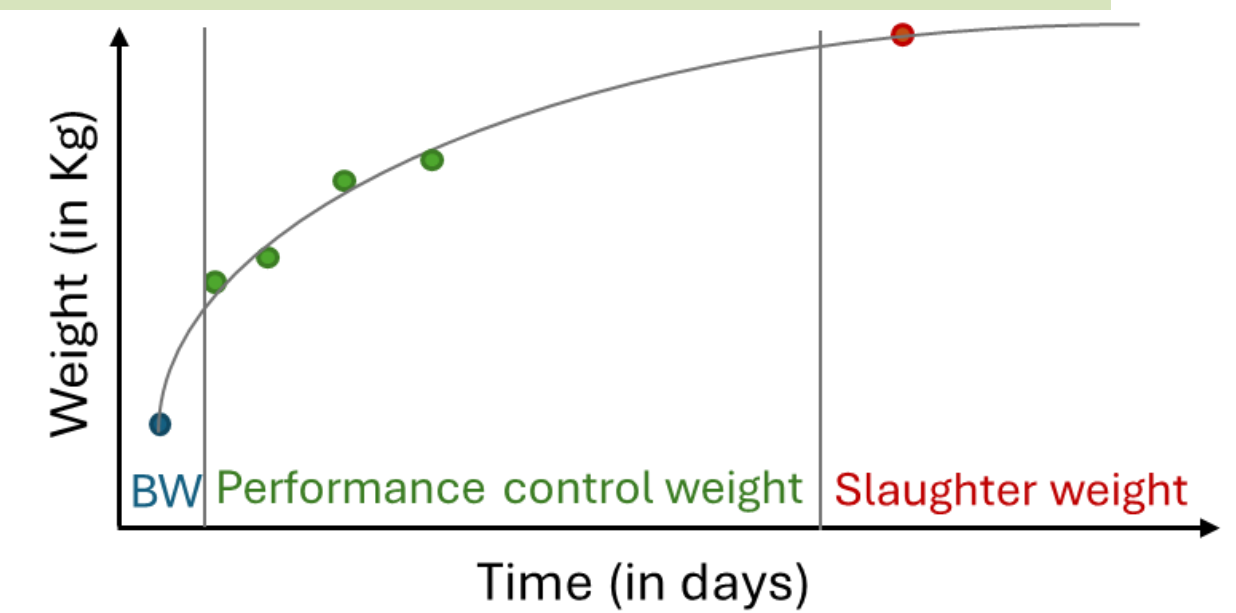
Particularity of the maturing rate index:

- This trait is interesting to :
  - Maximise early beef production
  - Reduce fattening time and added concentrates
  - Reduce the environmental impact of finished products
  - Facilitate 2-year-old calving through early development
- Moderate heritability of 0.24 and genetic variability of 9%
- Estimated phenotype after slaughter (at least 4 years old)

**Genomic selection on the maturing rate index is essential**

## MATERIAL AND METHODS

**Performance of maturing rate index** : Estimated on adult females of 5 beef breeds using individuals weighings and the Brody equation.



**Brody equation:**

$$Weight(time) = Weight_{adult} - (Weight_{adult} - Weight_{birth})e^{-maturing\ rate\ index \times time}$$

**Genomic evaluation:**

- Univariate Single-Step model with HSSGBLUP software
- 7 fixed effects related to birth and slaughter + age at slaughter as a covariate.

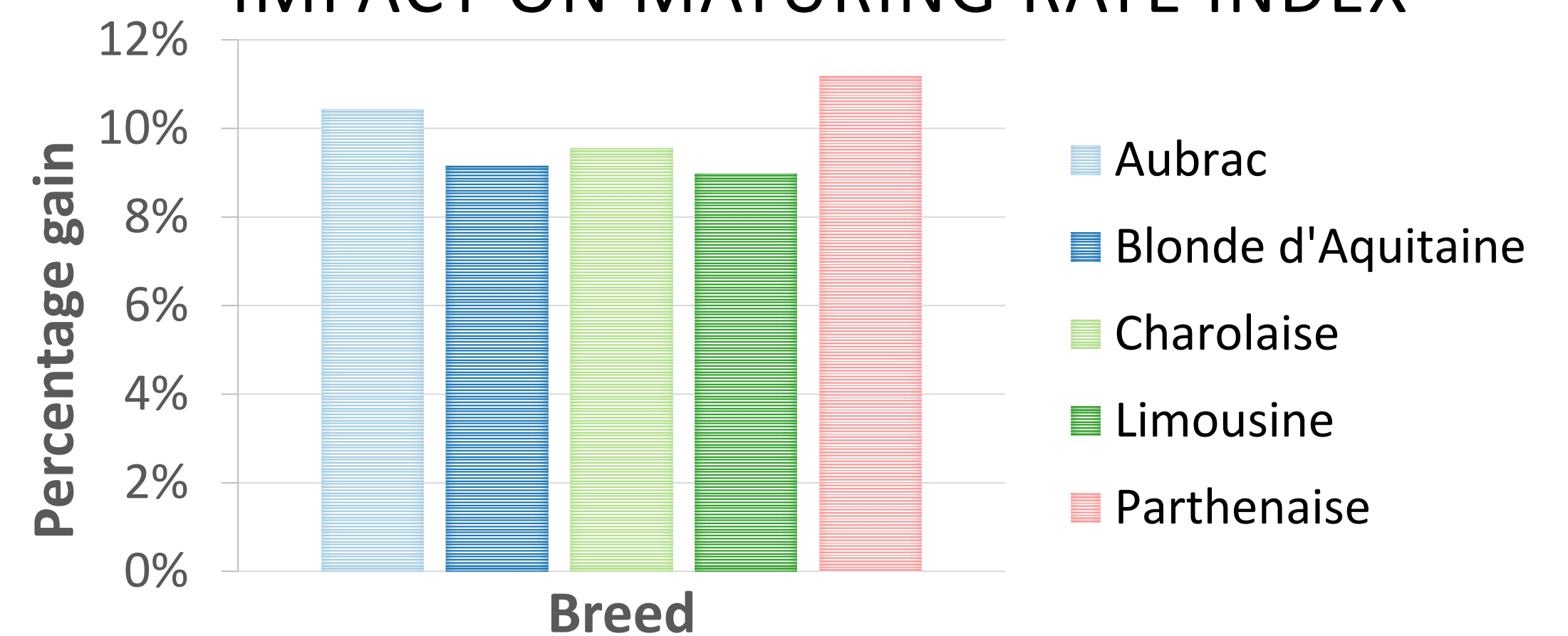
## RESULTS AND DISCUSSION

### Number of animals used in genomic evaluation

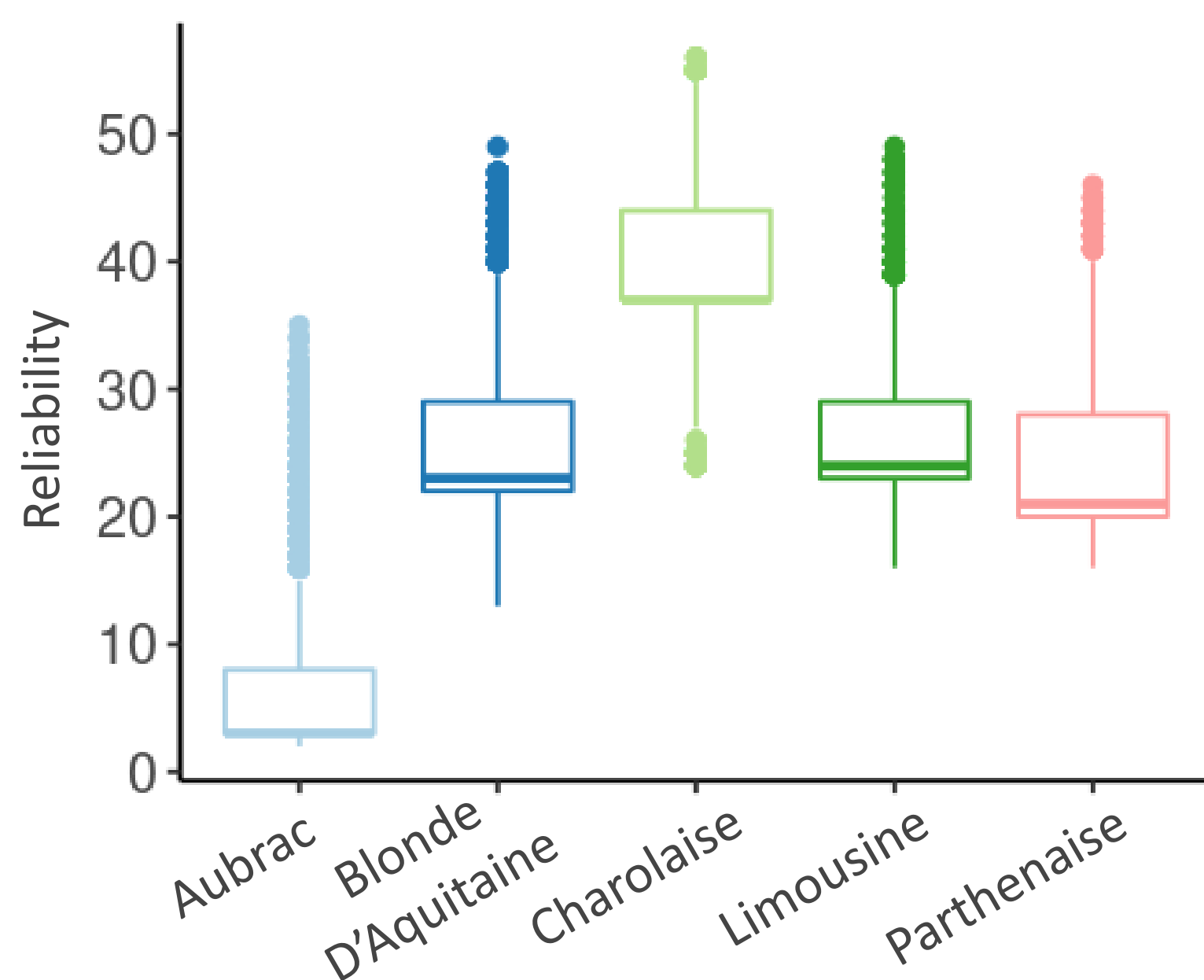
Breed	Animals in pedigree	Animals phenotyped	Reference population
Aubrac	23,155	7,269	414
Blonde d'Aquitaine	171,204	93,718	3,856
Charolaise	811,536	460,627	7,360
Limousine	449,507	270,417	2,179
Parthenaise	61,851	38,929	1,060

### Impact of a +1 standard deviation selection on performance

#### IMPACT ON MATURING RATE INDEX



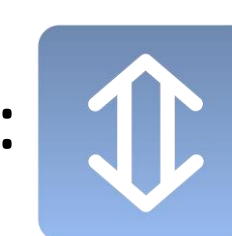
### Reliability of GEBVs of genotyped candidates in each breeds:



The reliability of candidates is fairly low, so it is important to take this into account during selection, particularly for the Aubrac.

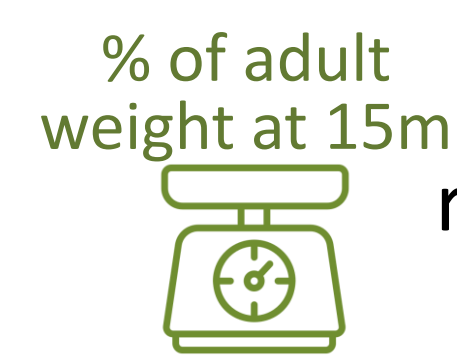
Increasing the size of the reference population by genotyping females with performance data would be a good strategy for improving the accuracy of estimates

This impact is equivalent to :



an average gain of -1.3 months to reach 50% of the adult weight across all breeds (-1 to -1.7 month)

OR



an average gain of 3.2% of the adult weight reached at the age of 15 months across all breeds (+3% to +3.5 %)

**BUT ALSO**



an average loss of -40.6 kg of the adult weight across all breeds (-35 kg to -50.7kg)

## CONCLUSION

- Selecting on the maturing rate index is of interest for the productivity and profitability of the cattle beef farm
- A genomic evaluation is important to select as early as possible
- Evaluation requires regular genotyping of females to improve the reliability of GEBVs

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