



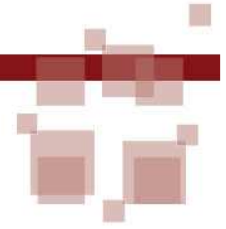
Genetic parameters for litter traits including farrowing duration and piglet survival up to weaning in French Large White sows

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Session 02 – « New phenotypes for new breeding goals »



Context



Genetic selection

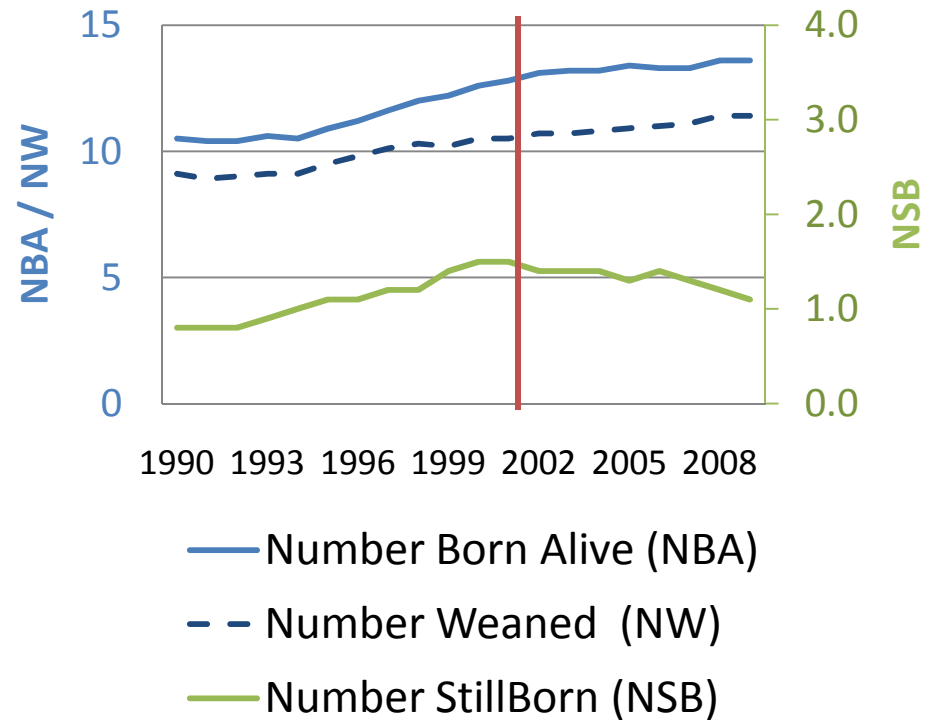
😊 ↗ Litter size

☹️ ↗ Stillbirth

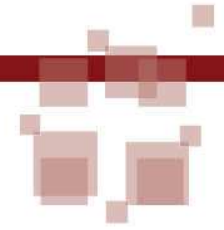
☹️ ↗ Pre-weaning mortality

↗ Need for birth assistance

Phenotypic trends



From 2002, selection for NBA instead of total number of piglets

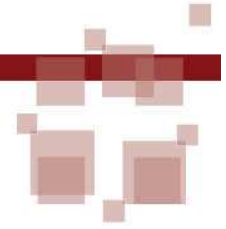


Which new traits could be included in the French breeding goal to improve piglet survival?

- farrowing duration
- birth assistance
- piglet weight characteristics



Material & Methods

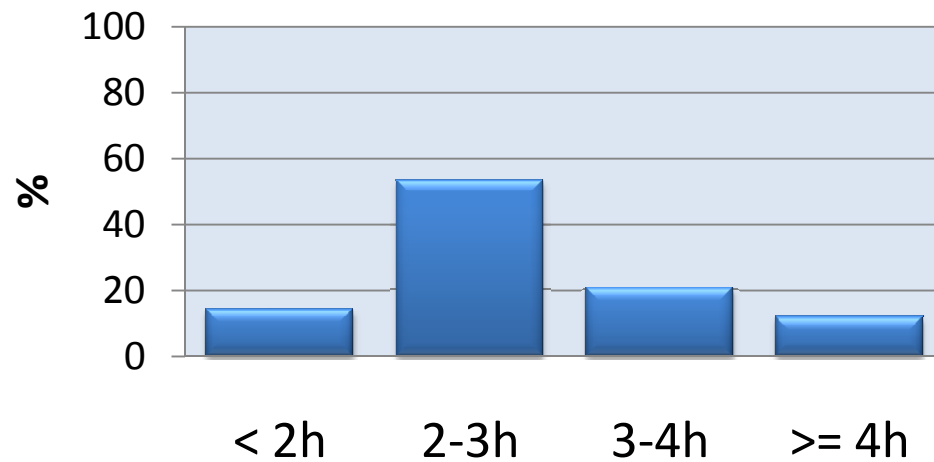


■ Data collected in 24 nucleus LW herds

Traits		Abbreviations	Litters
Litter size	Number of piglets born alive	NBA	20,648
	Number of stillborn piglets	NSB	
	Number of weaned piglets	NW	
Birth weights	Average piglet birth weight	ABW	2,086
	Within-litter standard deviation of piglet birth weight	SDBW	
Farrowing process	Farrowing duration	FD	14,957
	Birth Assistance	BA	19,597

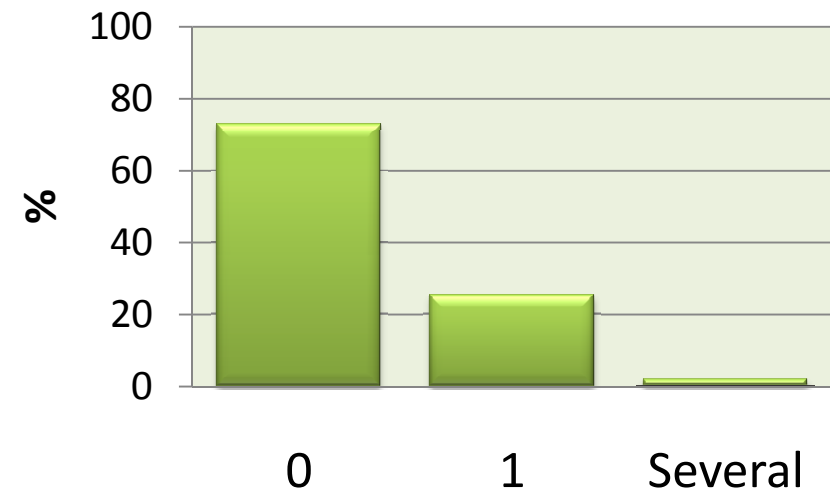
Distributions and statistical transformations

Farrowing duration



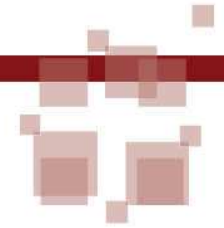
Normal distribution

Birth Assistance



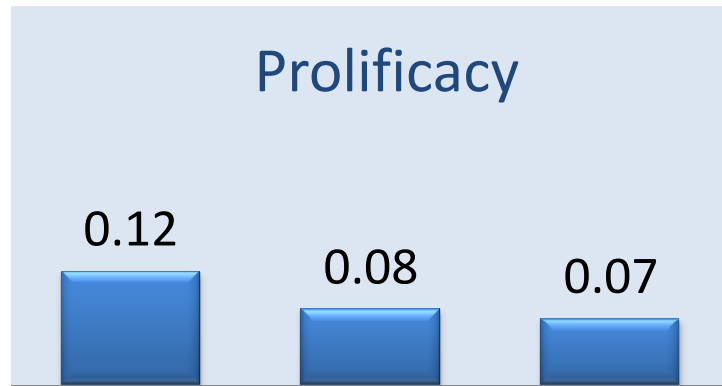
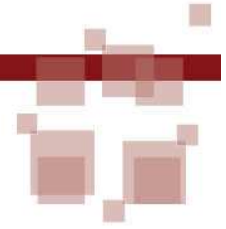
Poisson distribution

Model



- REML methodology applied to multiple trait animal models (DMU software)
 - Fixed effects: parity, herd/year/season, mating type (AI or natural service)
 - Random effects: additive genetic value, sow permanent environment
 - Covariates: sex ratio, NBA, age at weaning

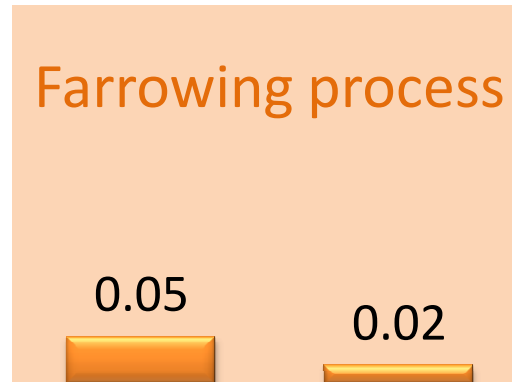
Heritability estimates



NBA

NSB

NW



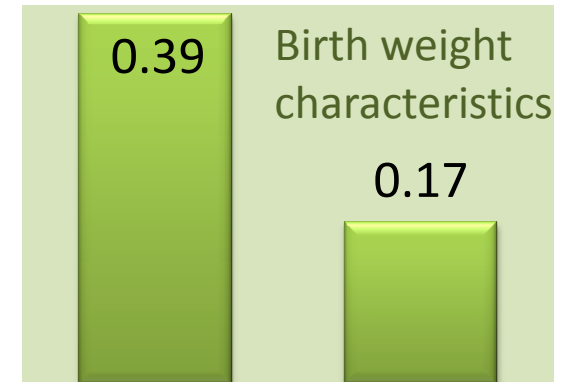
0.05

0.02

FD

BA

Not possible to include
in a breeding program



0.39

Birth weight
characteristics

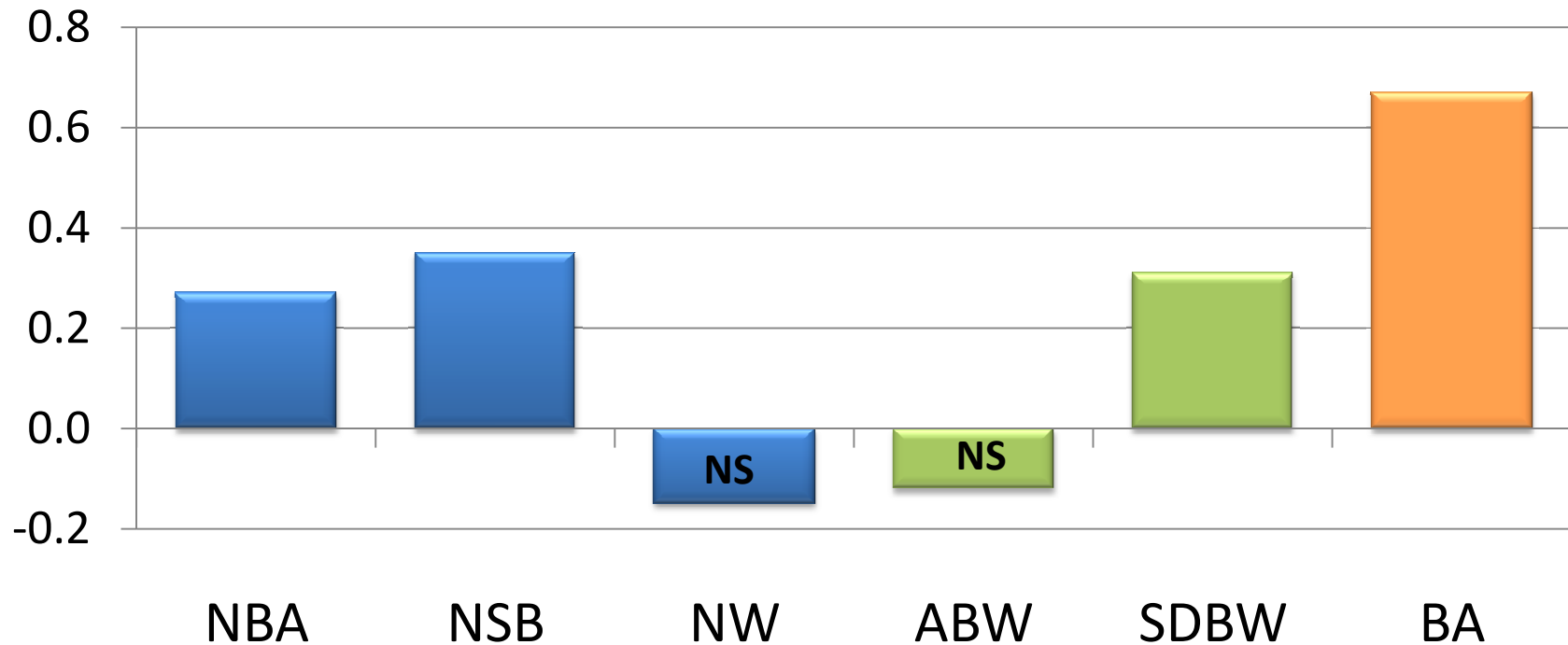
0.17

ABW

SDBW

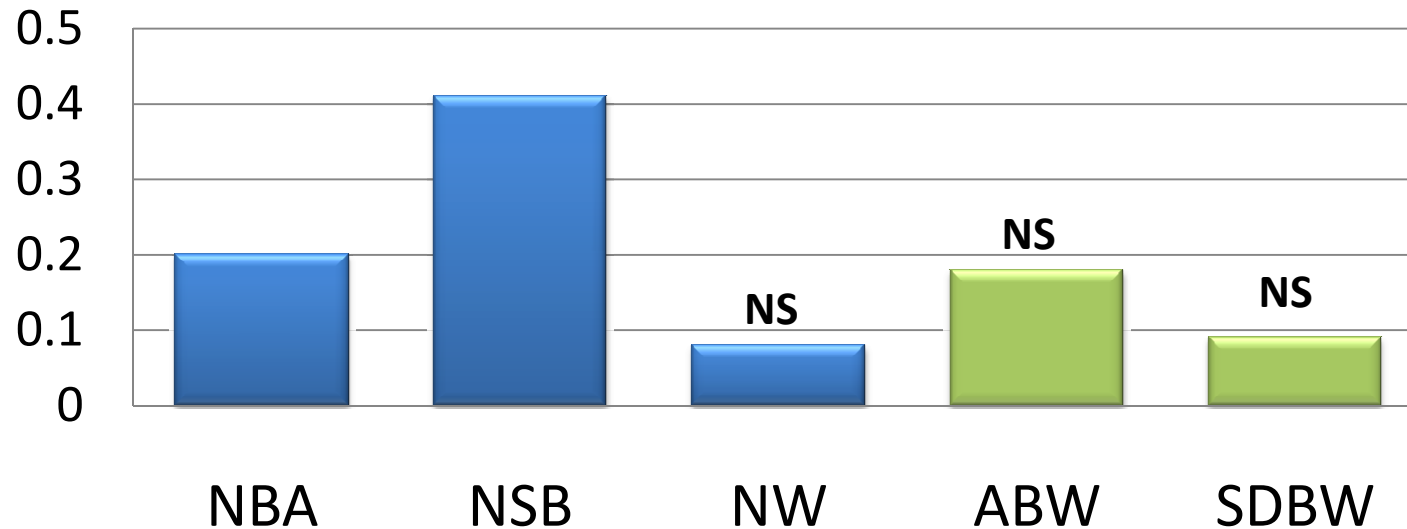
Possible candidate
traits for selection

Genetic correlations with Farrowing Duration



Longer farrowing duration \leftrightarrow higher occurrence of stillborn piglets
Heterogeneity of piglet weights \Rightarrow longer farrowing process
FD and **BA** : similar underlying genetic cause

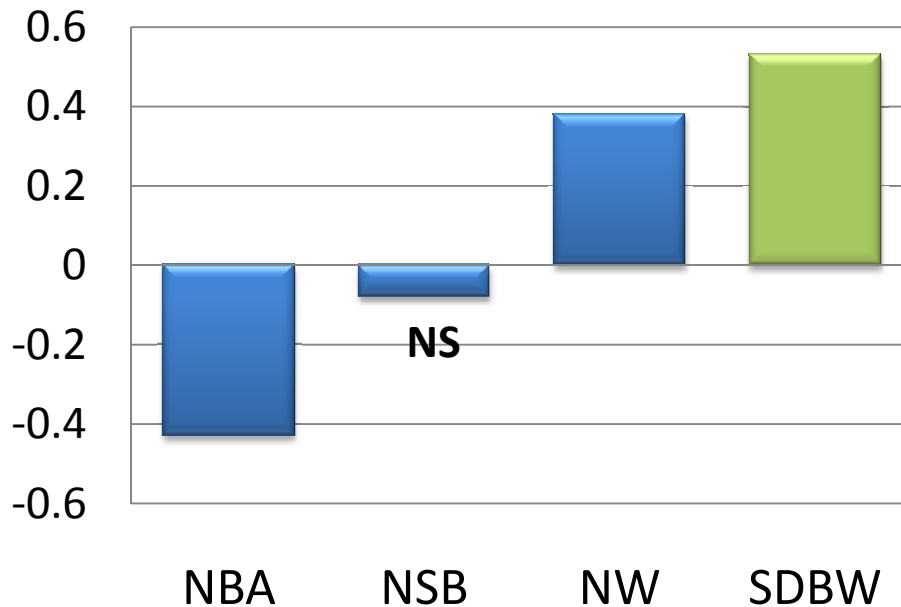
Genetic correlations with Birth Assistance



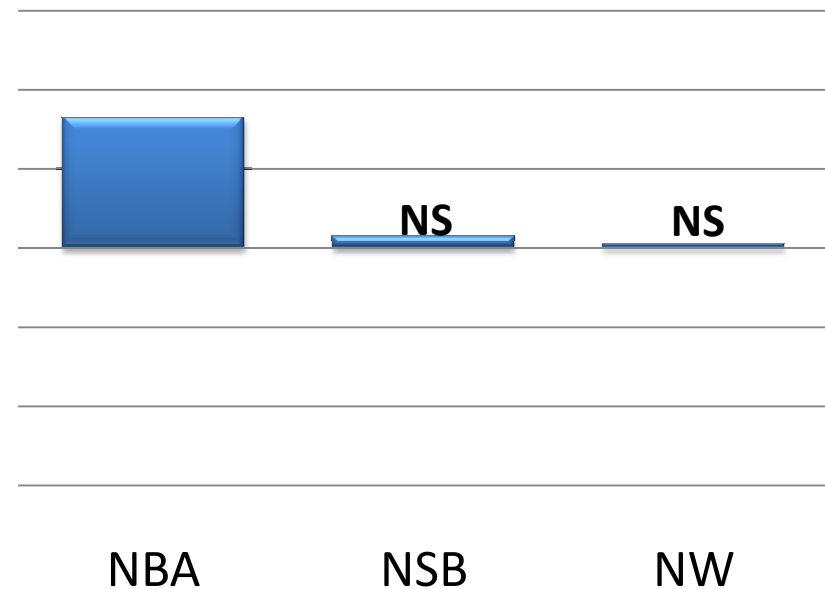
BA is moderately associated to the number of stillborn piglets **BUT** is not dependent of average litter weight and heterogeneity within litters

Genetic correlations with litter weight characteristics

Average Birth Weight

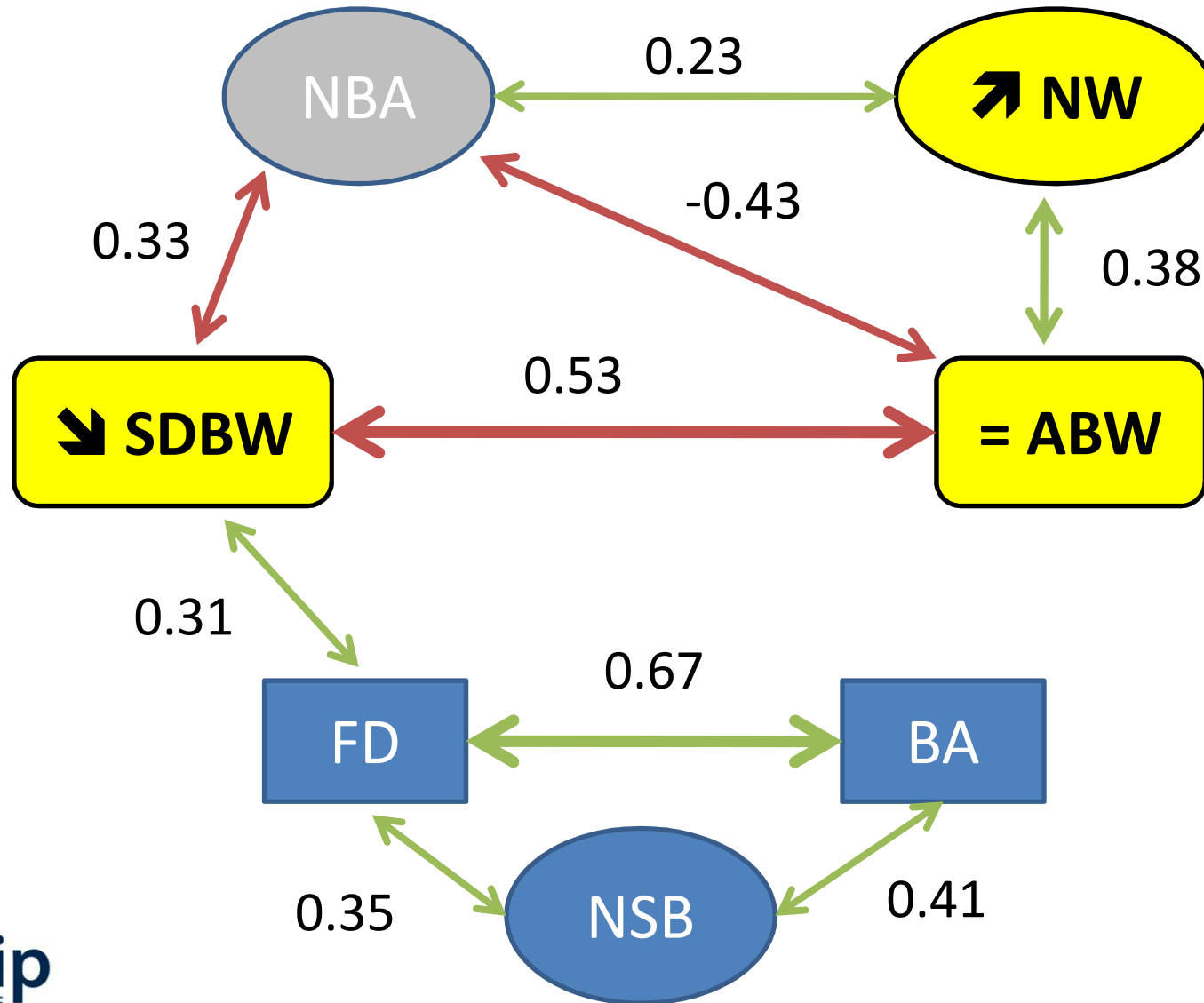


Birth Weight SD

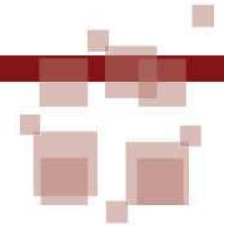


Genetic antagonism between ABW and (NBA and SDBW)
No significant correlation of SDBW with number weaned piglets due to cross fostering

Implications



Conclusions and perspectives



- **Estimates of heritability of FD and BA are low**
 - recorded routinely by French breeders ⇔ keep an eye on relationships with other traits
- **New French LW breeding goal: NW instead of NBA**
- **New concern : ↘ human interventions**
 - New breeding goals might decrease the need for birth assistance
- **Is it possible to find an approximate measurement to avoid individual recording of birth weights?**



Special thanks go to breeders for diligent data recording

This study was conducted with the technical collaboration of:



Thanks for your attention