



Direct and maternal genetic relationships between calving ease, fertility, production and somatic cell count in UK Holstein-Friesian heifers

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Introduction

- Focus in cattle breeding is shifting from traits that increase income towards traits that reduce costs

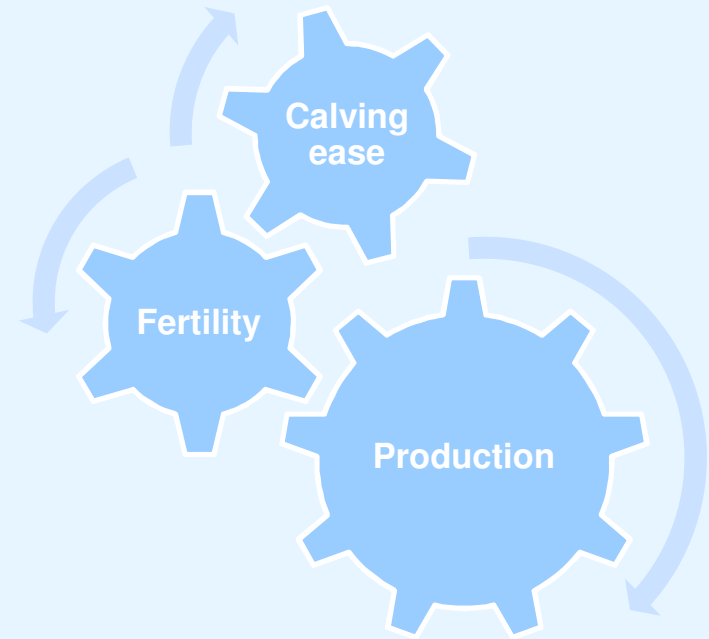
(De Maturana *et al*, 2007)

- Fertility, well known important fitness trait
- Calving ease (CE), gaining in attention
 - Economics & animal welfare
 - Direct and maternal effects



Aim

- Lack of understanding on the genetic relationships between calving ease, fertility and production traits

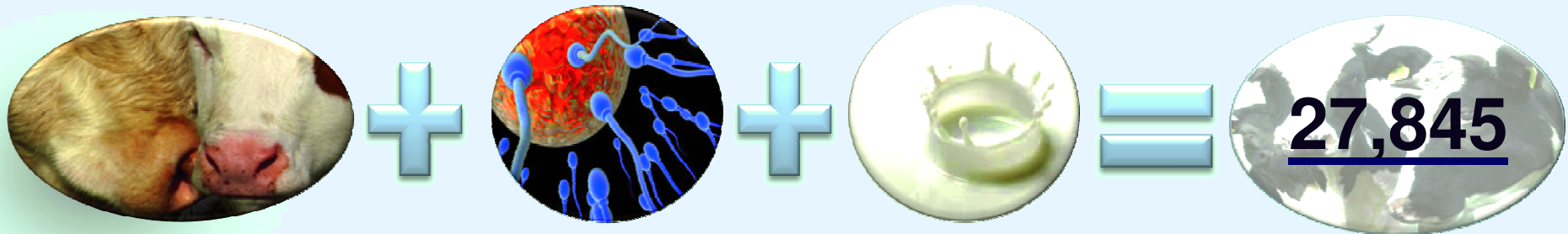


Study the **direct and maternal genetic relationships** between **calving ease, fertility** and **milk production traits**

Material and methods

Data

- Two milk recording organisations in the UK



1: easy (non-assisted)
2: moderate farmer assistance
3: difficult farmer assistance
4: vet assisted

• Calving interval
• Days to first service
• Number of inseminations
• Non-return after 56 days

• Milk yield at 110 dim
• Acc. 305-day milk yield
• Acc. 305-day somatic cell count

• Only HF
• CI 300-600 days
• Age 18-40 months
• Contemporary group >1
• CE scores transformed
• Milk yield checked

Conclusions

1. **Ease of birth** and **ease of calving** are genetically **correlated** with **fertility**
2. **Ease of birth** is genetically **correlated** with **milk production**
3. Both **direct and maternal effects** need to be **considered** in **selection decisions**

Material and methods

Analyses

- Trivariate analyses in ASReml, linear mixed models

- Fixed:

- sex of calf
- data source
- age of dam
- herd
- year*month
- (days pregnant)

- Random:

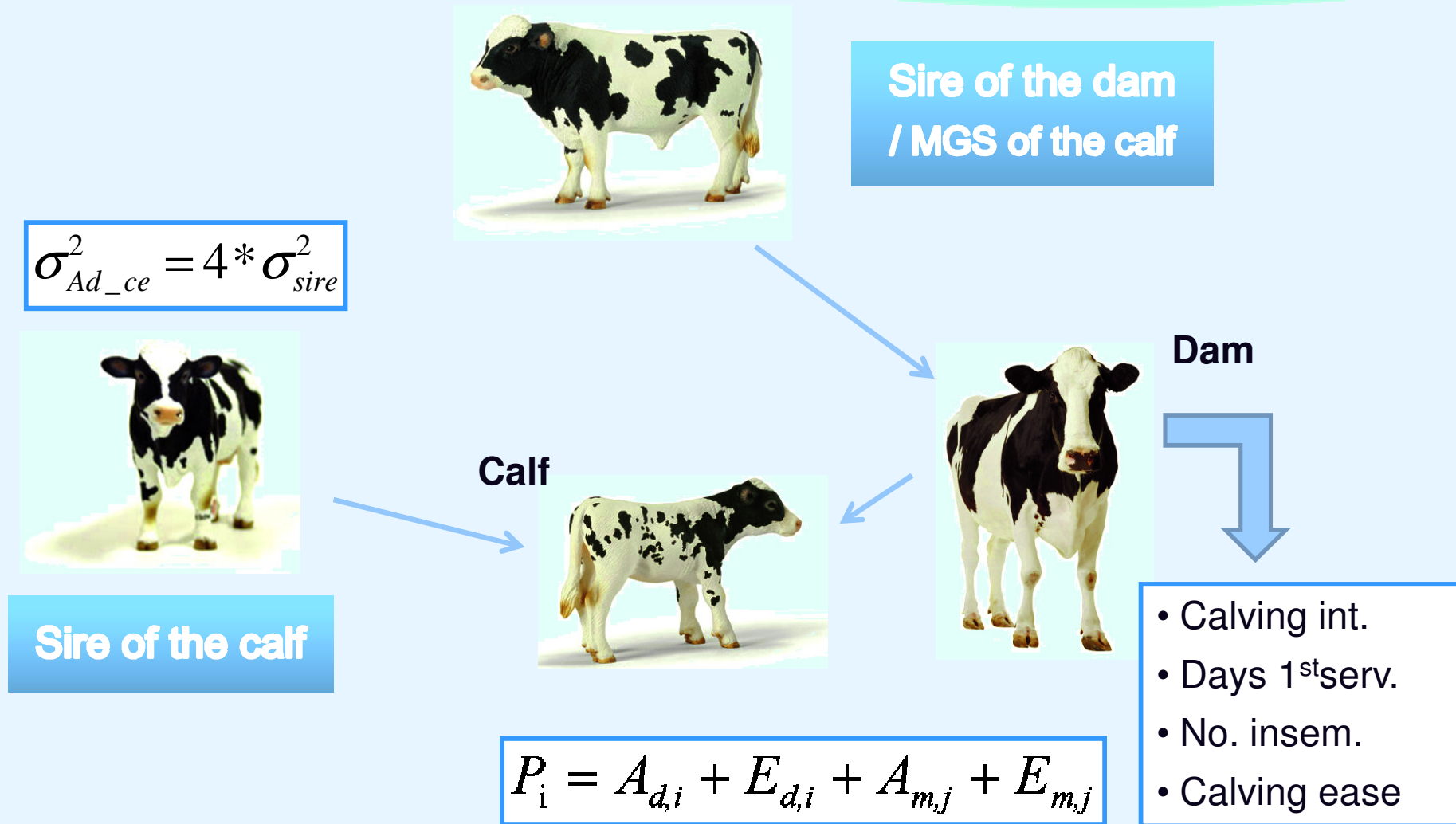
- sire of cow / mgs
- sire of calf (CE)
- herd*year

- Accounting for direct and maternal effects and their covariance
- Variance-covariance matrix G: 4x4, for each analysis



Material and methods

Analysis



Results

	Trait	h^2	$r_{g,CE-dir}$	$r_{g,CE-mat}$
<i>Calving</i>	Calving Ease - dir	6.1%*	1	-0.25 (0.20)
	Calving Ease - mat	3.7%*	-0.25 (0.20)	1
<i>Fertility</i>	Calving Interval	2.2%*	-0.60 (0.25)*	0.61 (0.25)*
	Days to 1 st service	7.0%*	-0.33 (0.21)	0.17 (0.23)
	No. of inseminations	2.4%*	-0.25 (0.25)	0.62 (0.22)*
	Non-return 56 days	1.8%	0.67 (0.27)*	-0.54 (0.31)
<i>Milk production</i>	Milk yield at 110 dim	34%*	-0.31 (0.15)*	0.14 (0.17)
	Acc. Milk yield 305-d	50%*	-0.44 (0.15)*	0.31 (0.16)
	Somatic cell count	14%*	0.07 (0.18)	0.13 (0.18)

* P < 0.05

Discussion

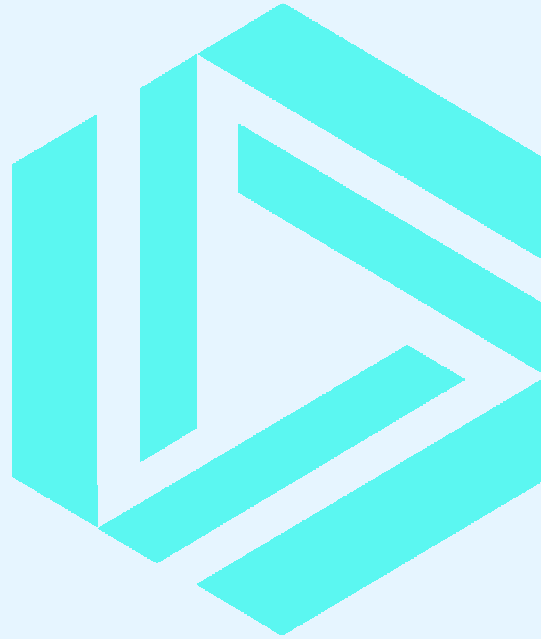
- A difficult *calving* is related to a **longer CI** and a **higher NINS**
- A difficult *birth* is related to a **shorter CI**, a **lower NINS** and **reduced milk production**
- The **difference** between the **direct and maternal** relationships needs **careful consideration**
- Genetic correlations with other important selection traits might aid in the understanding of this

Acknowledgements



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SAC

Success through **Knowledge**