

**An investigation on the effect  
of management factor and  
contemporary group definition  
on the genetic evaluation of  
Calving Interval in British  
Limousin cattle**

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# Background



- UK beef genetic evaluations
  - EGENES evaluates 10 breeds
- Limousin EBVs
  - Growth – BWT (dir & mat), 200D (dir & mat), 400D, MW
  - Carcass – MSC, FD, MD
  - Fertility – GL (dir & mat), CE (dir & mat), AFC, CI

# What is Calving Interval



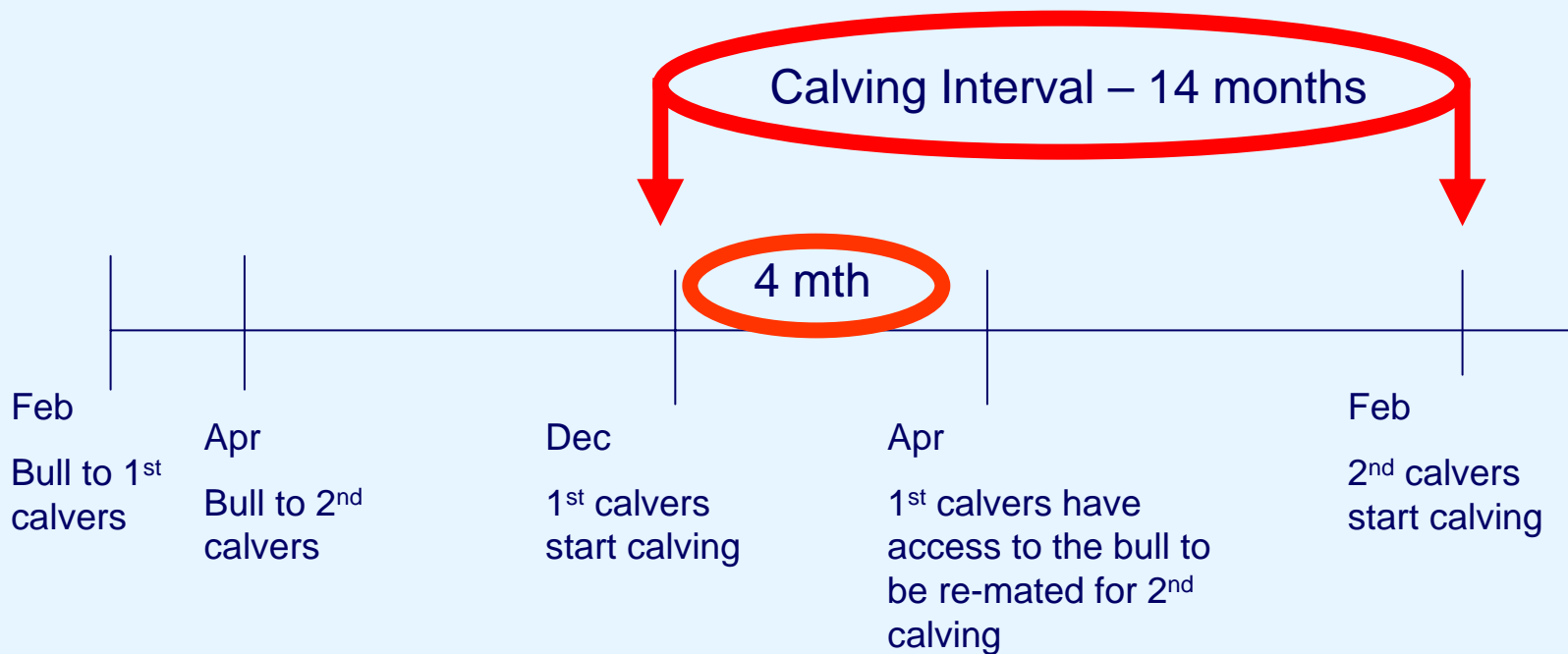
- Sex limited trait
- Number of days between a cows 1<sup>st</sup> and 2<sup>nd</sup> calf
- Measured only once per cow
- Measures cows ability to
  - Recover from the 1<sup>st</sup> calving
  - Return to oestrus and get back in calf
  - Gestation length of the 2<sup>nd</sup> calf
- Important because if a cow is not producing calves then she provides no income

# Background



- Anecdotal reports that in some cases animals were being penalised in the calving interval (CI) EBV by management decisions
- Early calving heifers may not have the opportunity to re-mate when they first return to oestrus

# Example



# Calving interval



- Valid range between 290 and 630 days
- CI in a single record CG removed
- Moderate negative genetic correlations between CI and AFC
  - Rg between -0.07 (0.26) and -0.71 (0.54)
  - Roughsedge *et al.* (2005)

# Modelling calving interval



- $CI = CG + \text{calving month of 1}^{\text{st}} \text{ calf} + \%LIM + \text{animal effect}$   
+ FIXED  
COVARIATE  
RANDOM
- $CG = \text{herd of 1}^{\text{st}} \text{ calf} || \text{year of 1}^{\text{st}} \text{ calf} || \text{season}$ 
  - Season is a 6 month time period
- Two approaches
- 1. Deviate the AFC from the average AFC
  - To see if we could adjust better for the age when 1<sup>st</sup> calf is born
  - This had very little effect
- 2. Reduce the season time period to 3 months
  - Groups animals that have been treated alike together

# Results



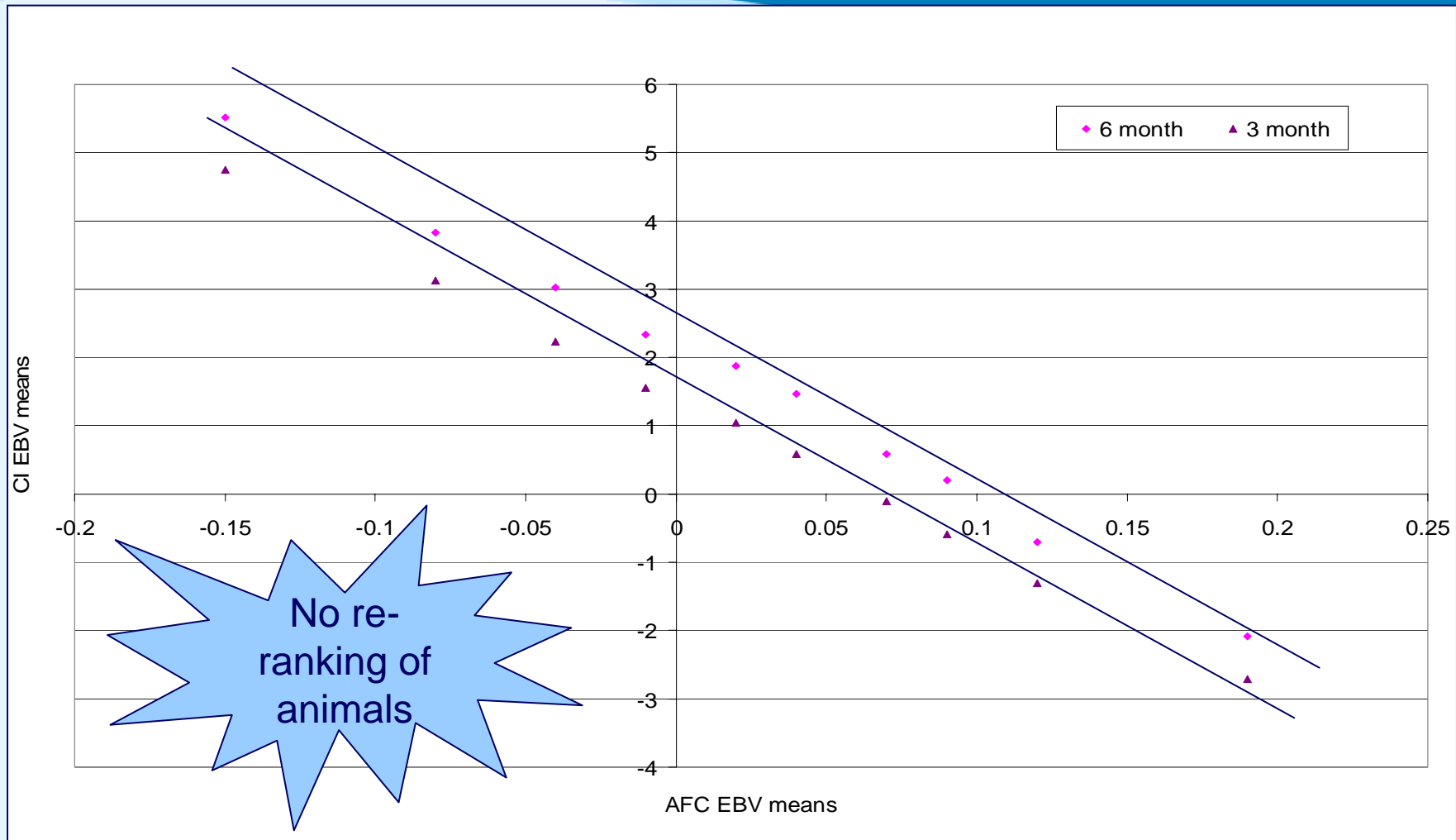
- Using BLUP methodology (Mix99 software), EBVs were produced for both season lengths and the results compared
- ~ 370 000 animals receive EBVs
  - data and pedigree
  - ~30% have 200 day weight recorded
  - ~10% with CI recorded
- Limited records available

# Average EBVs (SD)



Data set	N animals with CI	N CG	Av CG size (SD)	Max CG size
6 month	34,186	9,849	3 (3.2)	37
3 month	29,232	9,778	2 (2.6)	36

Dataset	All animals		Animals with both records	
	AFC	CI	AFC	CI
6 month	0.01 (0.08)	1.24 (3.87)	0.02 (0.10)	1.62 (5.51)
3 month	0.01 (0.08)	0.73 (3.25)	0.02 (0.10)	0.88 (4.85)



# Investigation of particular bulls

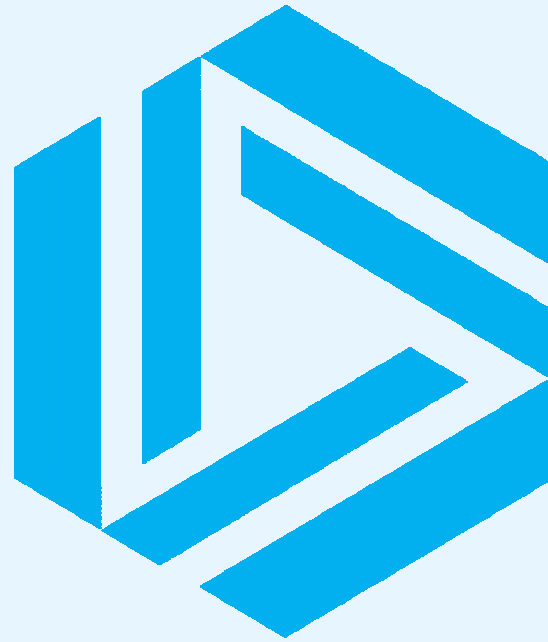


- We have looked in detail at six bulls thought to have been penalised by the management effects of their daughters
  - Sires ranged in AFC EBVs
  - Compared the raw CI of daughters to their contemporaries
  - Trends were consistent across CG, years and herds
- In all cases we could not find evidence of bias from management effects

# Conclusions



- No evidence could be found to support the anecdotal reports of biased EBVs due to management effect
- Given the present data structure it is difficult to improve this measure of fertility
- The UK Calving Interval EBVs does identify animals that have genetically shorter calving intervals



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