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### **Multiple breed evaluation for Cow Survival and Fertility in Irish Beef cattle**

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#### **Abstract:**

Cow survival and fertility are together with calving difficulty, gestation length, calf mortality, weaning weight and cull cow carcass weight proposed in a maternal beef cattle index. Beef breeding values for cow survival and fertility are predicted with one multiple trait sire model for reappearance, lifespan and calving interval including beef, dairy and crossbred information. Since information on cow survival or reappearance is scarcely available in historical beef data, reappearance curves are proposed as survival indicators for animals that did not reappear within 300-450 days. Different breed effects were accounted for with a regression on the sire and dam breed percentage.

Average lifespan for beef was with almost 3 years and survival with 0.73 to 0.79 in lact1 to 3 slightly lower than for dairy with the difficulty of having more missing and censored records. Reappearance fractions as survival indicator were included in 8.3% to 2.4% of the censored in lactation 1 to 4.

Heritability, first lactations only, was 2% for cow survival and calving interval and 7% for lifespan; correlations were 0.37 and -0.47 for reappearance and lifespan with calving interval and 0.91 for reappearance with lifespan.

Using reappearance fractions and multiple breed data, including dairy and crossbreds, allowed multiple breed evaluation for cow survival and fertility in Irish beef cattle.

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# Multiple breed evaluation for Cow Survival and Fertility in Irish Beef cattle

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## Introduction

Cow survival and fertility is of major importance in countries with a seasonal calving pattern for both beef and dairy cattle. For beef, **Cow survival** and **Fertility** have been proposed in a maternal beef cattle index together with *calving difficulty, gestation length, calf mortality, weaning weight* and *cull cow carcass weight* (project team 2005). Since the number of records and amount information available on cow survival and fertility is limited in beef - we proposed one model for all breeds (see list).

## Model: survival and fertility

**Beef:** A MT sire model with 1<sup>st</sup> lactation reappearance, lifespan and calving interval. Including information from all beef breeds, dairy and crossbred as well. Breed was accounted for by a regression coefficient on both sire and dam breed.

**Dairy:** A MT animal model is applied as routine evaluation since 2003. Including 13 traits: fertility (calving interval), survival (cow reappearance), milk production (lactation 1 - 3) and 4 conformation traits.

**Angus**  
**Friesian**  
**Hereford**  
**Charolais**  
**Limousin**  
**Belgian Blue**  
**Blonde d'Aquitaine**  
**Red and White**  
**Montbeliarde**  
**Brown Swiss**  
**Simmental**  
**Shorthorn**  
**Holstein**  
**Jersey**  
**others**

Reappearance chances for beef cattle based on historical data

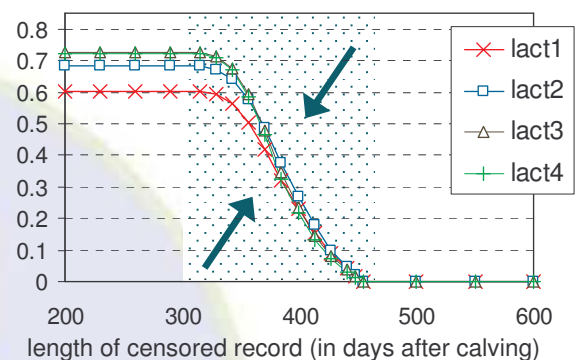


Table 1: Survival rates from historical data

Parity	1	2	3	4
Beef	0.73	0.80	0.84	0.80
Dairy	0.82	0.80	0.78	0.75

Table 2: Expected additional Lifespan

Parity	1	2	3	4	5
Beef	3.05	3.17	2.98	2.56	2.21
Dairy	3.06	2.73	2.41	2.09	1.8

Table 3: Parameters (diagonal: sire variance, genetic correlations below and residual correlations above)

	CIV1	SU1	LSP
CIV1	31.129	0.00	-0.06
SU1	-0.37	0.001	0.63
LSP	-0.47	0.91	0.082
h <sup>2</sup>	0.02	0.02	0.07

## Beef Survival: Reappearance rates

Since information on cow survival or reappearance is scarcely available in historical beef data, reappearance curves were proposed as survival indicators for censored animals within the interval 300 - 450 days (see Figure). Indicators were inserted in 8.3 - 2.4% of the censored records (for respectively lactations 1 - 4).

## Beef Lifespan: Herd life

Average lifespan (Table 2) was calculated according Brotherstone et al. (1997) using historical survival rates (Table 3)

## Summary

Reappearance (for beef index) and lifespan (considering herd life) provide useful information, although correlated. For beef the difficulty was to handle all the missing and censored records (up to 28%). Using reappearance fractions, lifespan and multiple beef breed data, including dairy and crossbred records, allowed one multiple breed evaluation for 1<sup>st</sup> lactation cow survival and fertility in Irish beef cattle.