

Genetic growth profiles for carcass traits in steers

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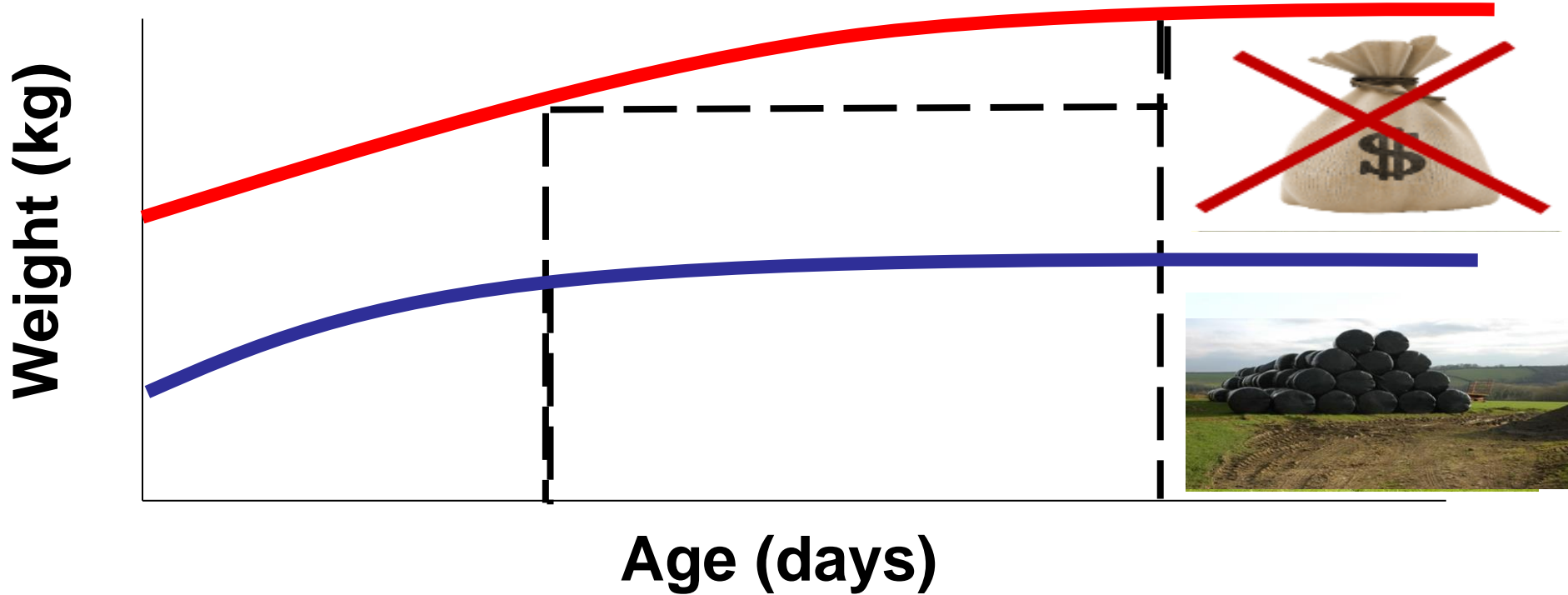
The Irish Agriculture and Food Development Authority

Growth Profiles

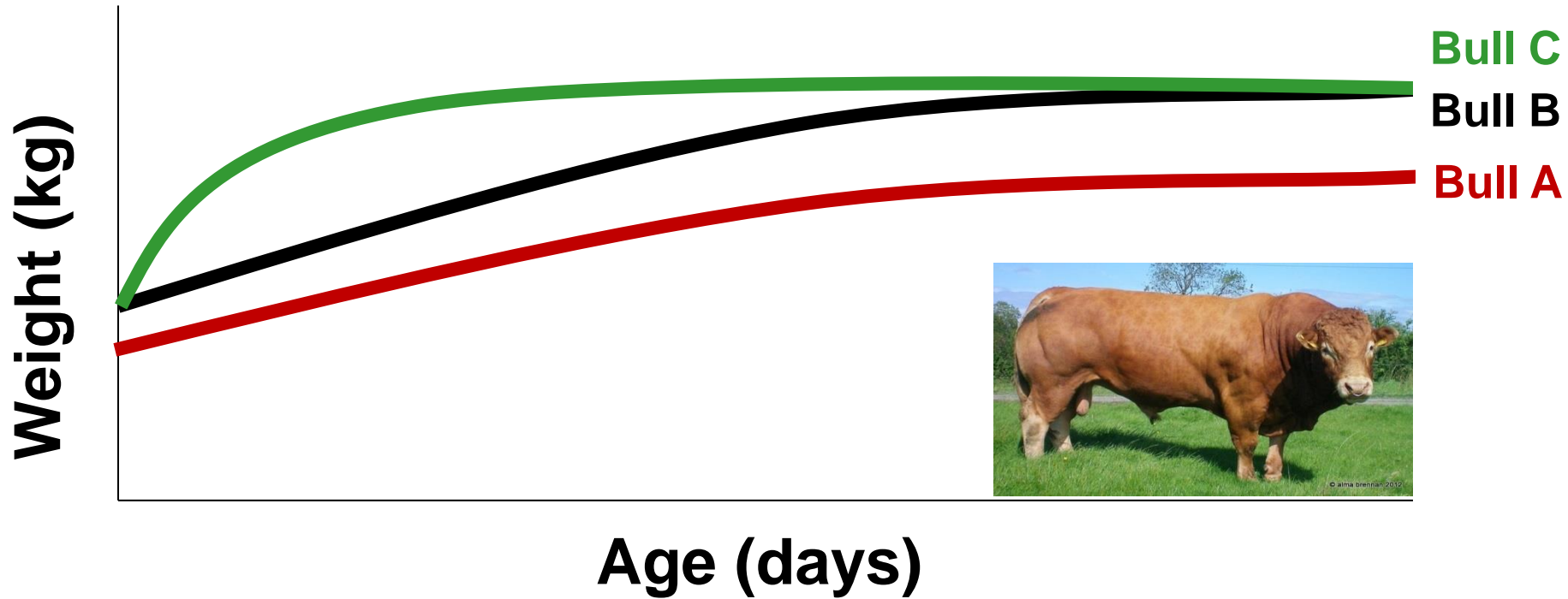
- **Modelling trait development over time**
- **Carcass growth (Δ carcass weight)**
- **Muscular development (Δ conformation)**
- **Body fat accumulation (Δ fat)**
- **Information on variation in rate of development**
- **Informed management decisions**



Growth rate



Within breed differences



Aim

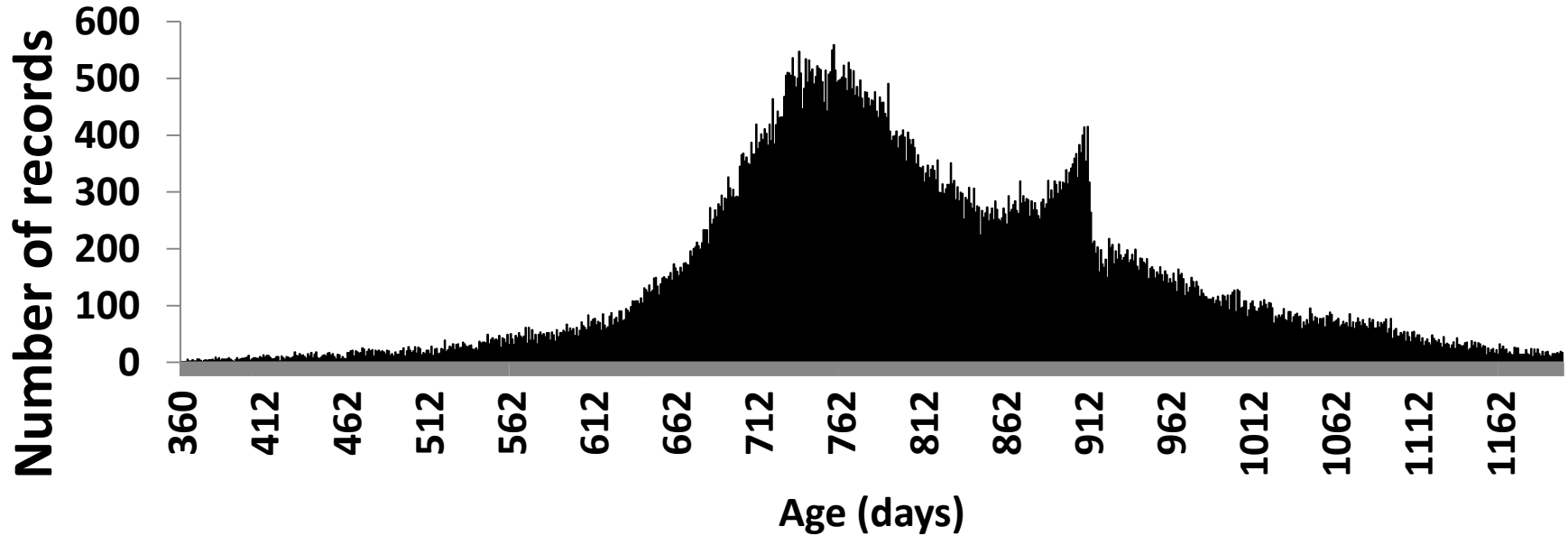
- **Examine variability in rate of trait development**
 - **Estimate optimum slaughter age of progeny**



Materials and methods

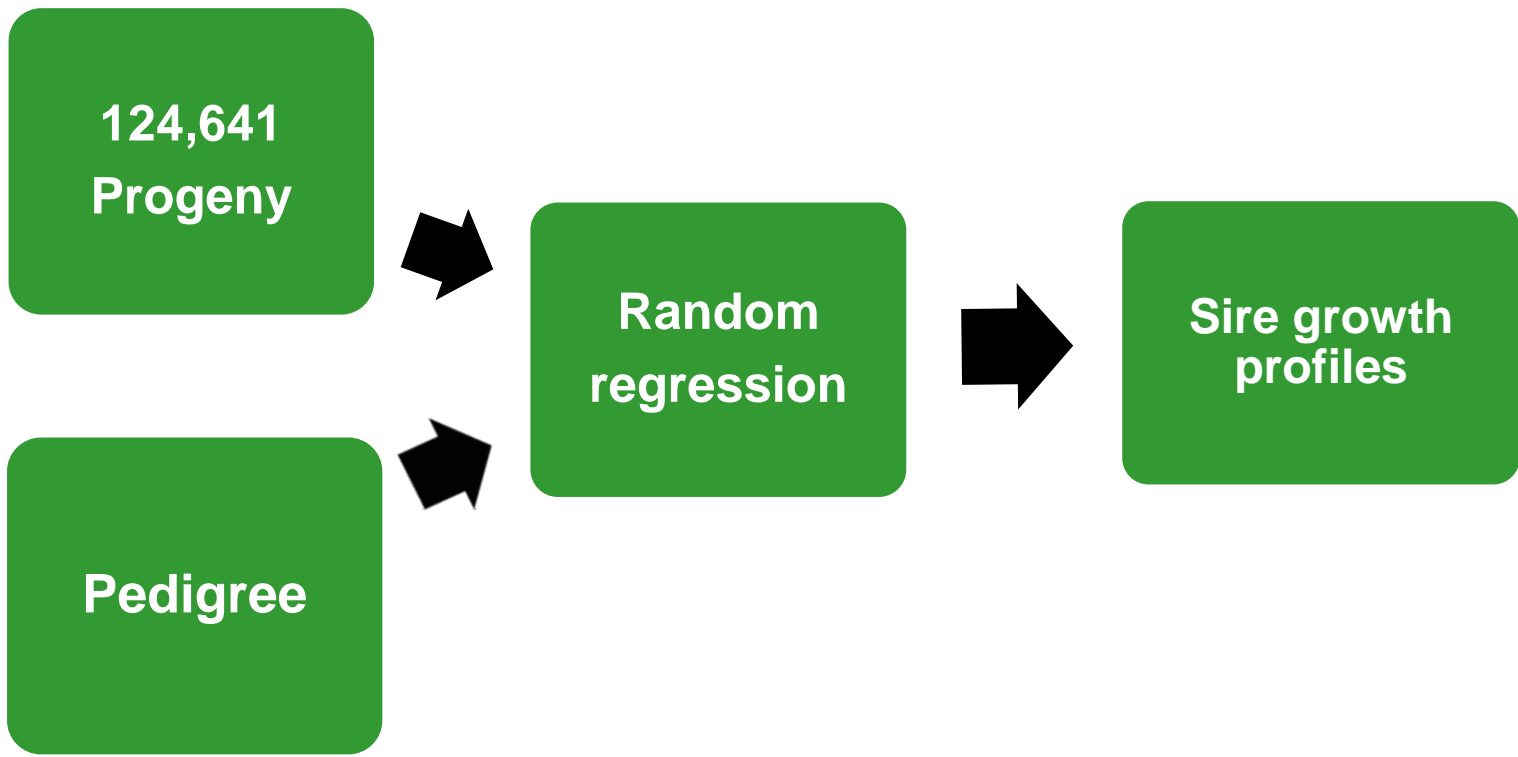
- **Carcass records 2010-2013**
- **Multiple beef and dairy breeds**
- **Steers: 360-1200 days**
- **Known sire and dam**
- **Sire \geq 5 progeny**

Age distribution



n = 124,641

Materials and methods



Random regression models

- **Model trait changes over time**
- **Using repeated measurements**
- **Not traditionally used in study of carcass traits**
- **Model traits at a sire level**

Random regression model

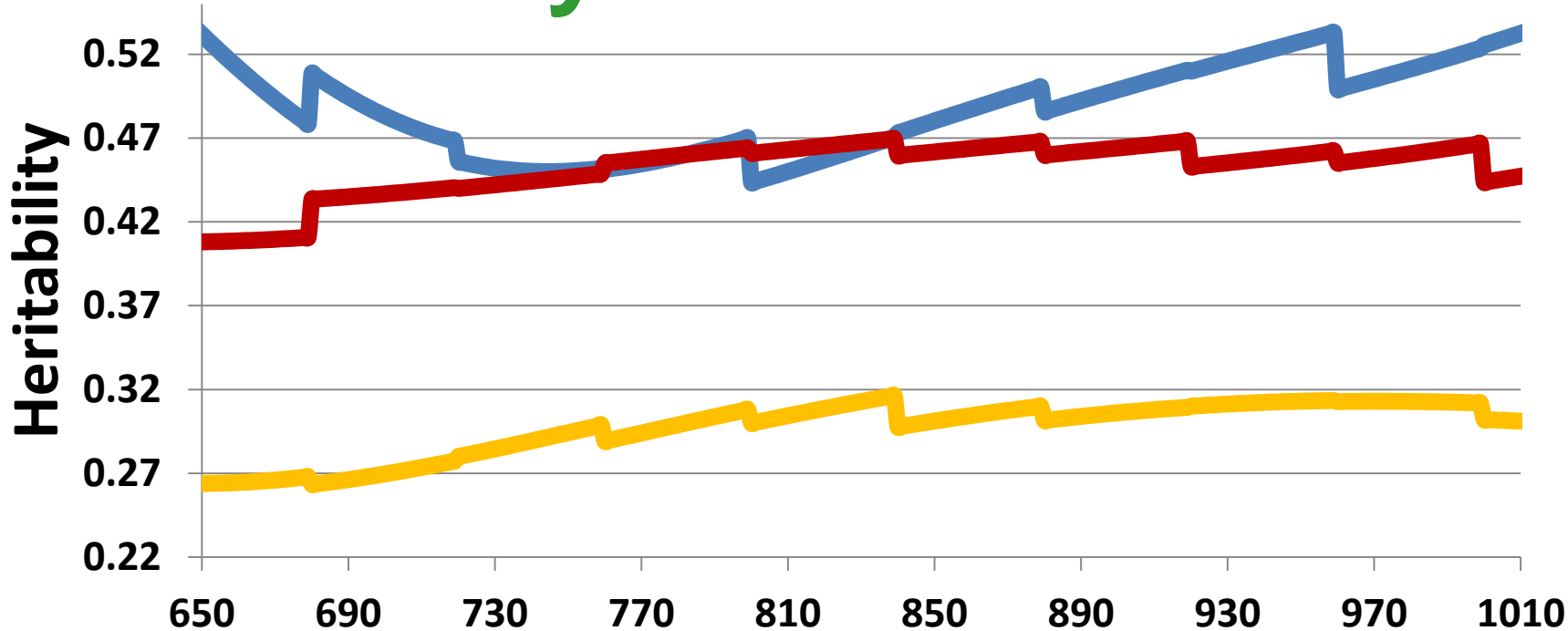
$$Y = \mu + \text{HYS} + \text{AbattoirDate} + \sum_{i=1}^{n=3} \text{Age}_i \Phi + \text{Het} + \text{Rec} + \text{Parity} + \sum_{i=1}^{n=3} \text{Age}_i \text{Sire}_i \Phi + e$$

Legendre Polynomial

Legendre Polynomial

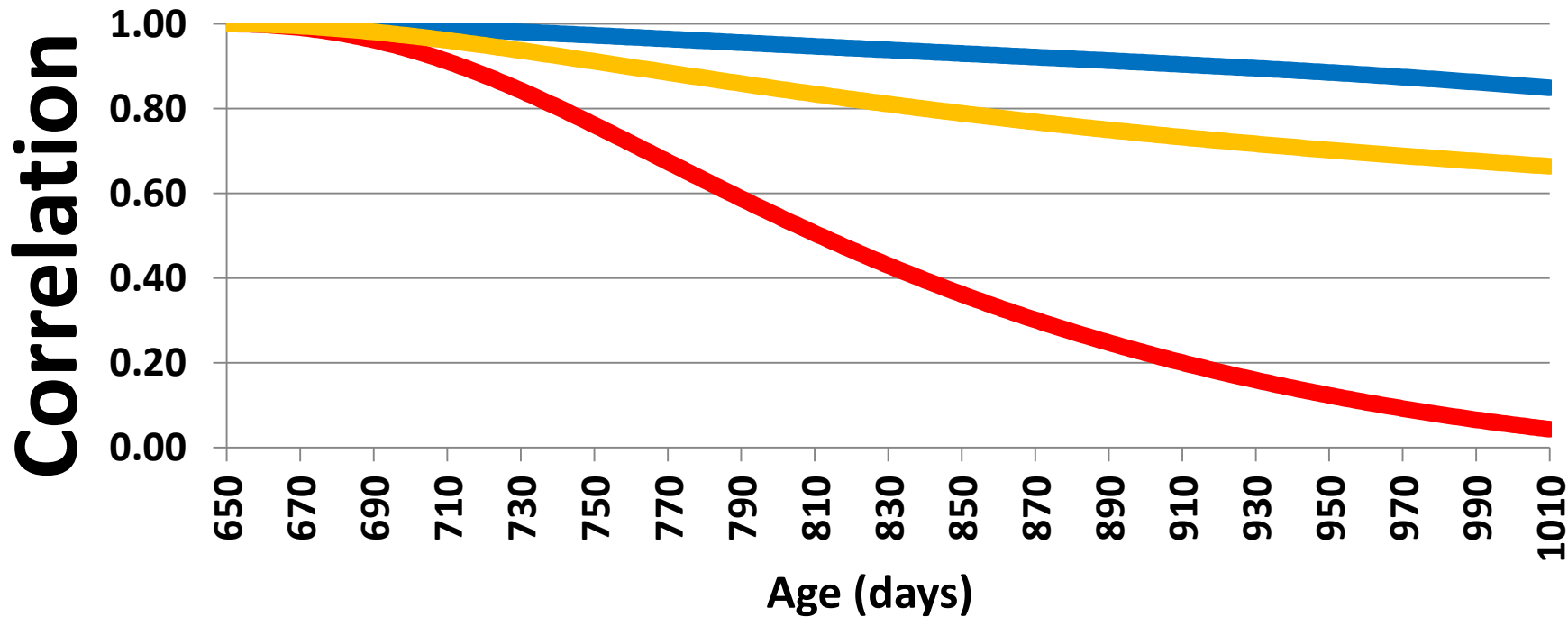
Results

Heritability



- Carcass weight
- Conformation
- Fat

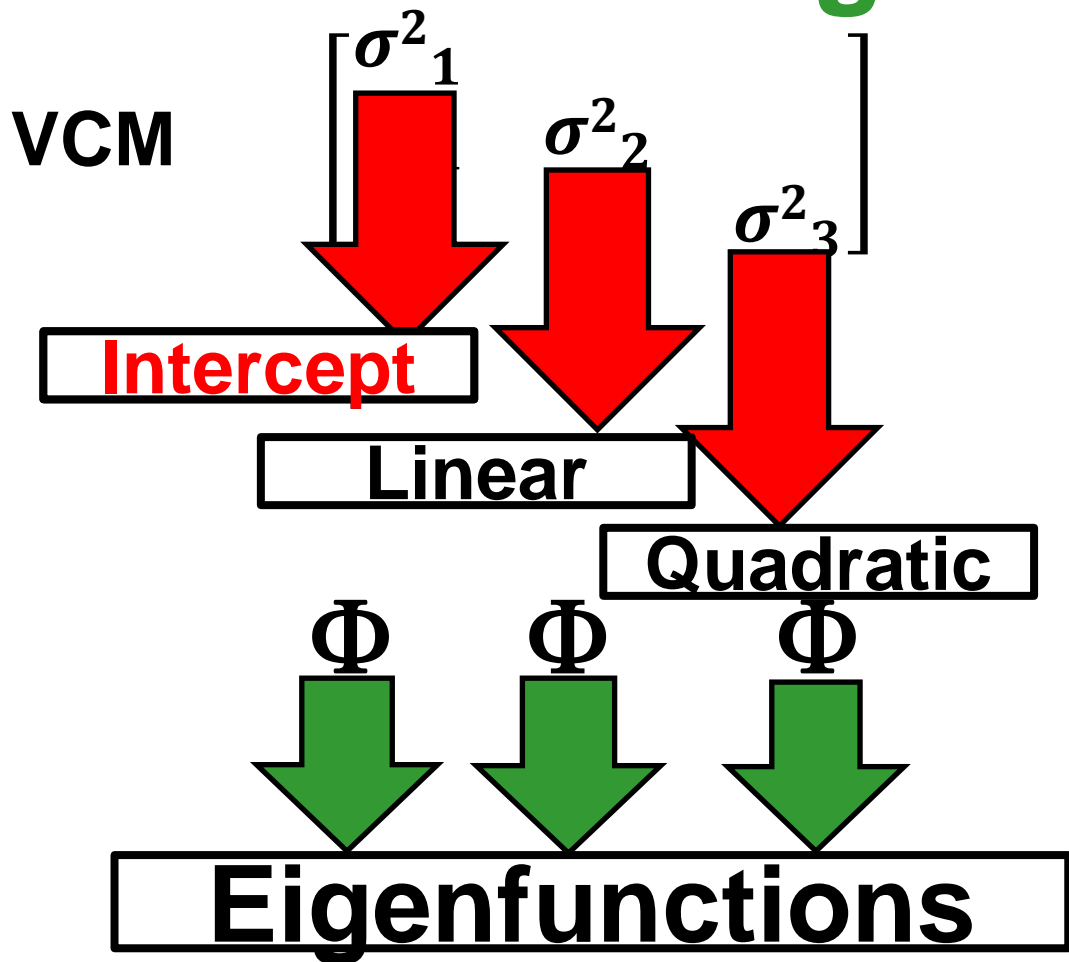
Genetic correlations within trait



- █ Carcass weight
- █ Conformation
- █ Fat

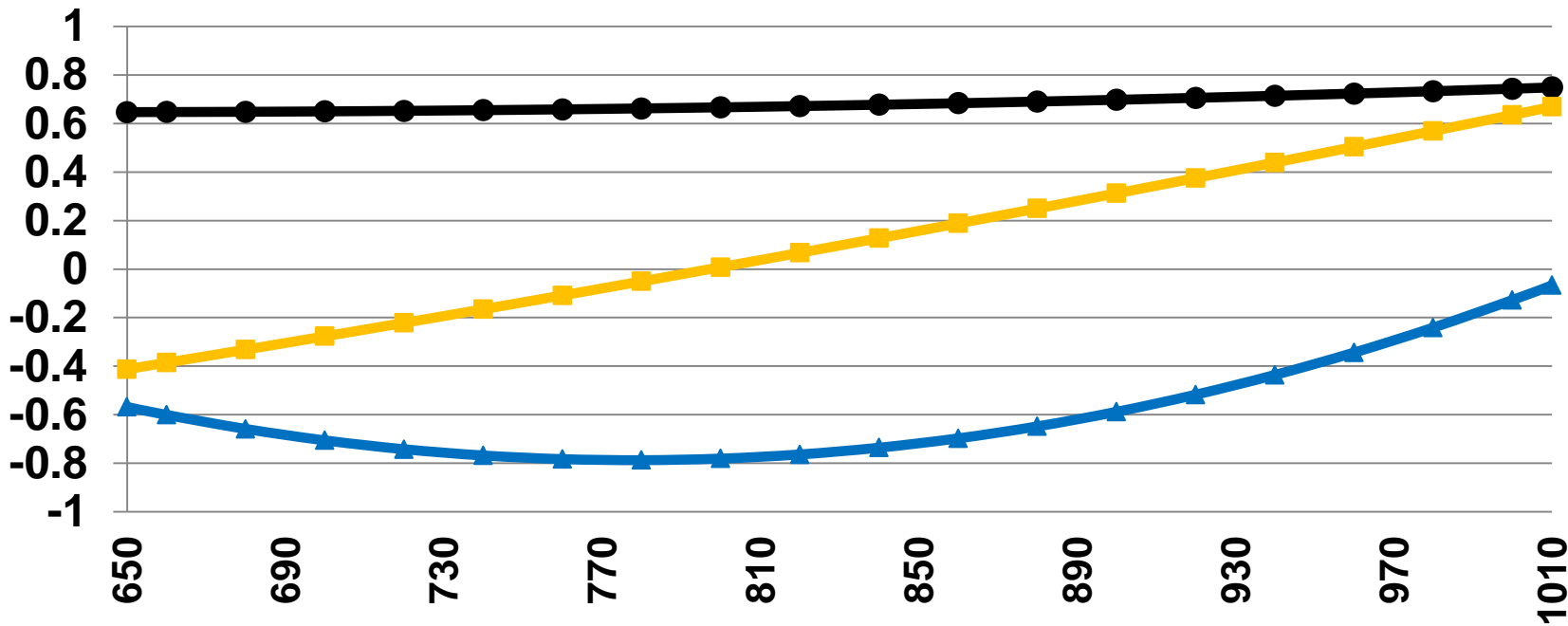
650 days

Eigenfunctions & eigenvalues



Eigenfunctions

Conformation

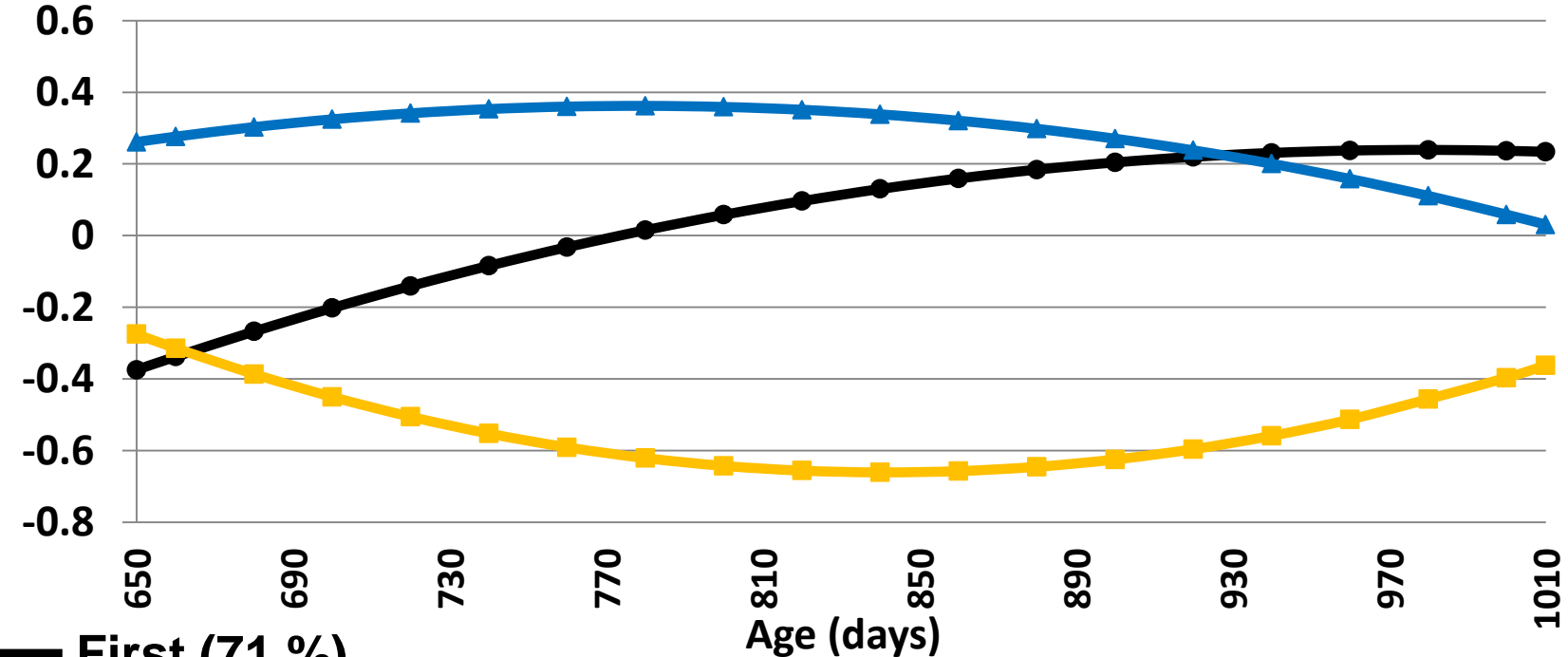


- First (77%)
- Second (16%)
- Third (7%)

Age (days)

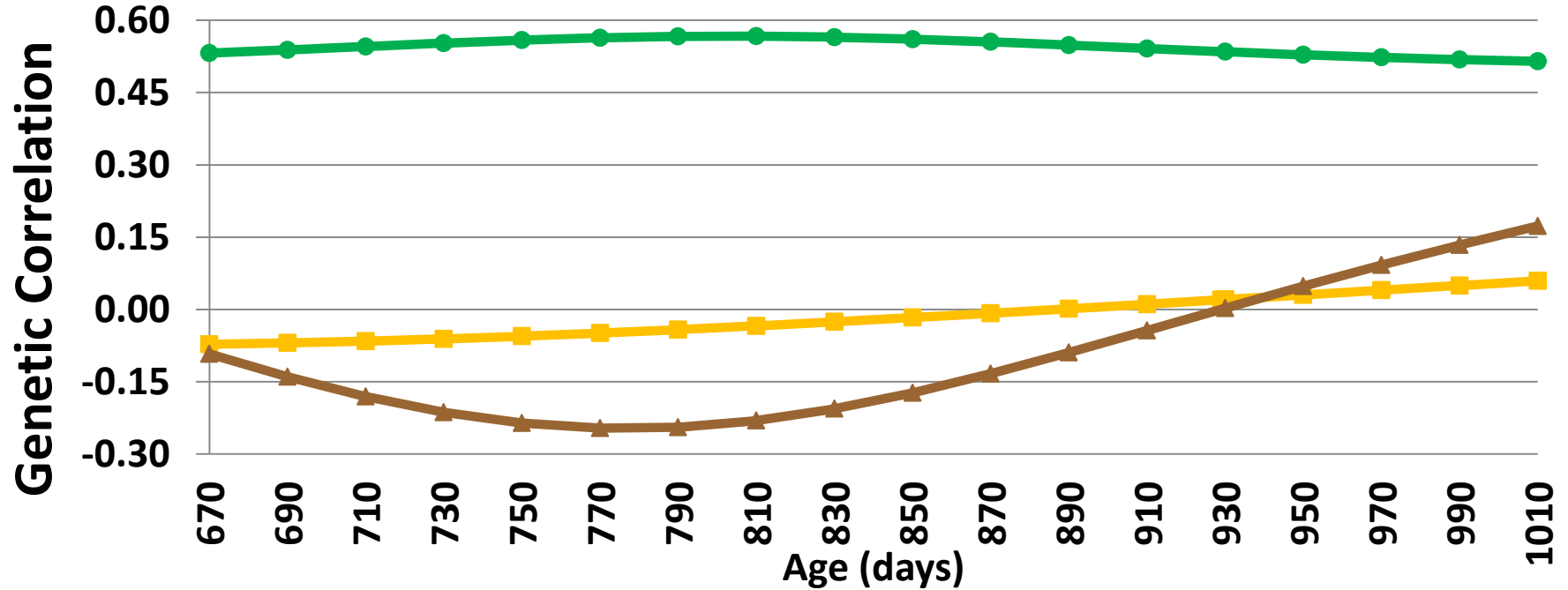
Eigenfunctions

Carcass weight



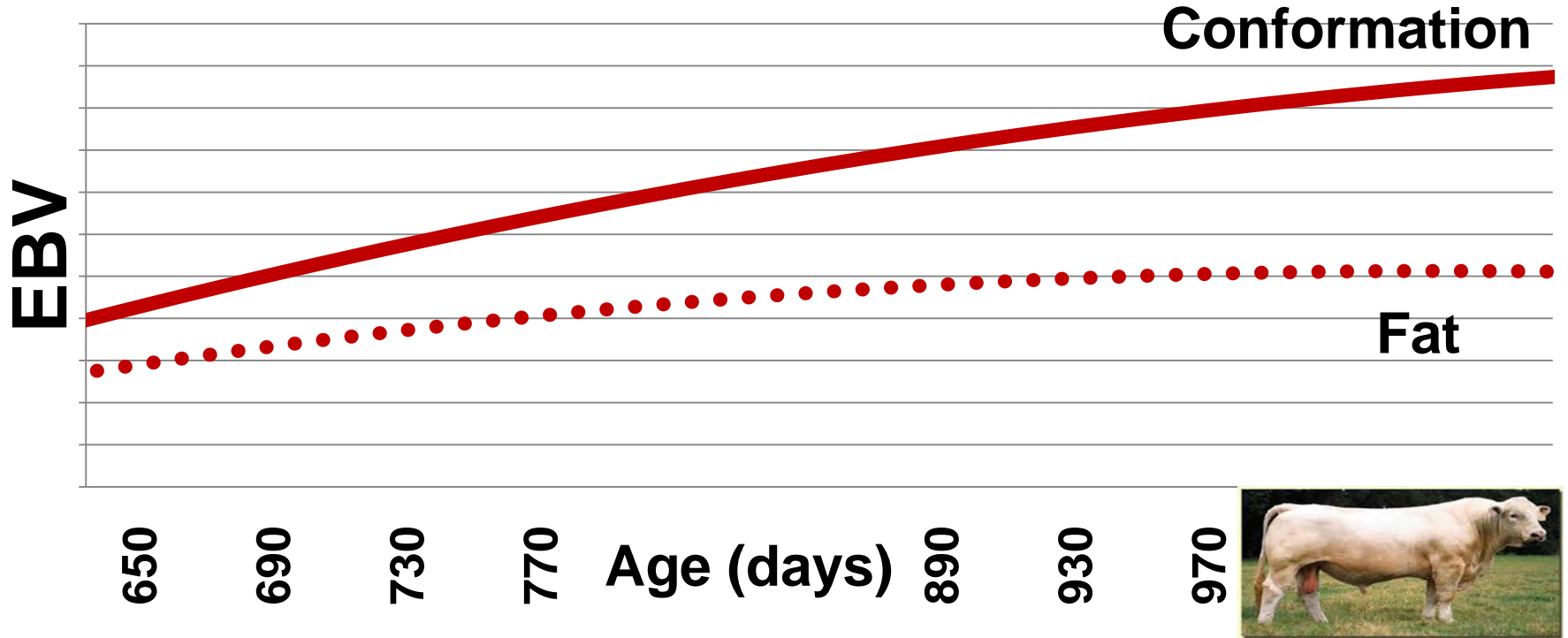
- First (71 %)**
- Second (21%)**
- Third (8%)**

Bivariate correlations

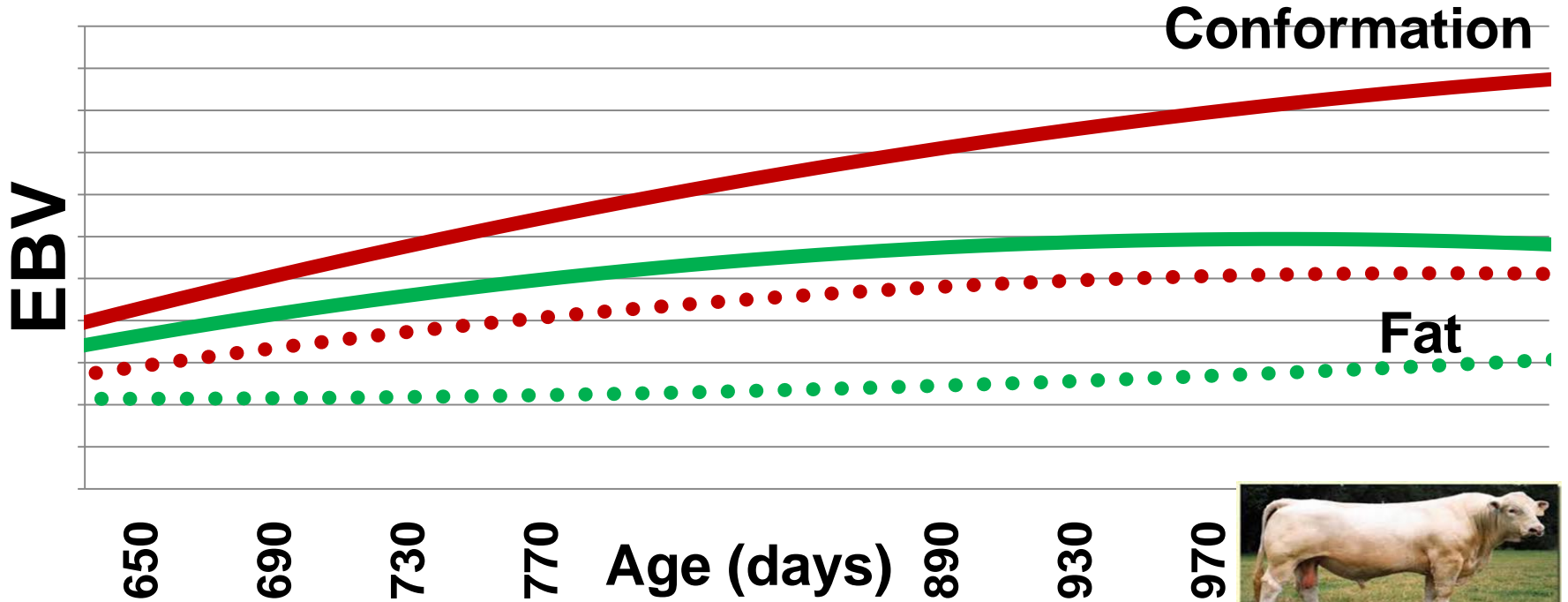


-  Carcass weight and Conformation
-  Conformation and fat
-  Carcass weight and fat

Within Breed



Within Breed



Conclusions

- **Carcass weight at younger ages is under different genetic control than at older ages**
- **Genetic variability exists among animals in the shape of their growth profiles**
- **May be exploited in breeding programs.**

Implications

Very Early Maturing



Early Maturing



Late Maturing



Very Late Maturing





Thanks For Listening