

RANDOM REGRESSION ANALYSES OF CARCASS TRAITS YIELD USEFUL HERD-YEAR PROFILES FOR MANAGEMENT PURPOSES



*T.M. Englishby^{1, 2}, K.L. Moore¹, M.P. Coffey¹,
D.P. Berry², and G. Banos^{1, 3}.*

*¹Scotland's Rural College (SRUC), Easter Bush,
Midlothian, Scotland.*

²Teagasc, Moorepark, Fermoy, Cork, Ireland.

³Roslin Institute, Easter Bush, Midlothian, Scotland.

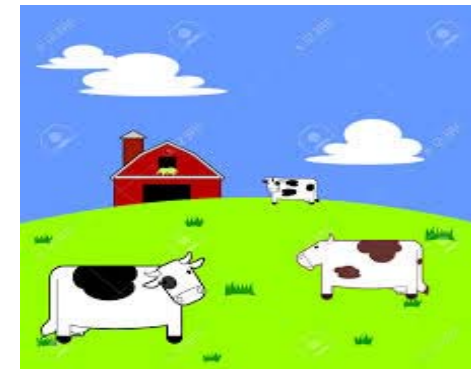
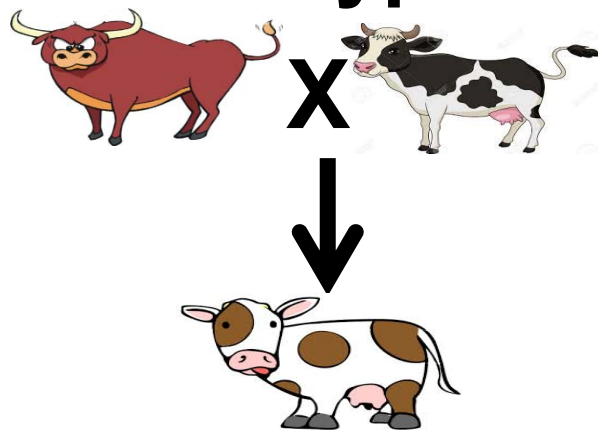


Leading the way in Agriculture and Rural Research, Education and Consulting₁

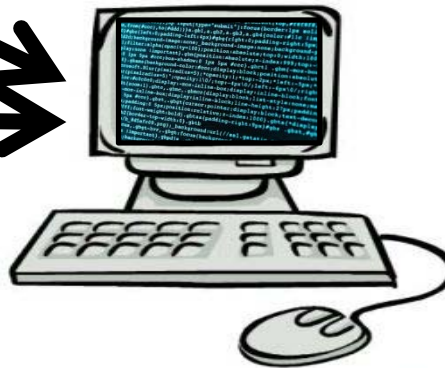
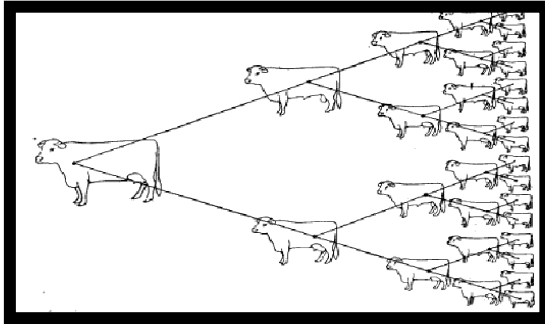
Carcass traits

- Main source of revenue for beef farmers
 - Carcass weight
 - Conformation score
 - Fat score

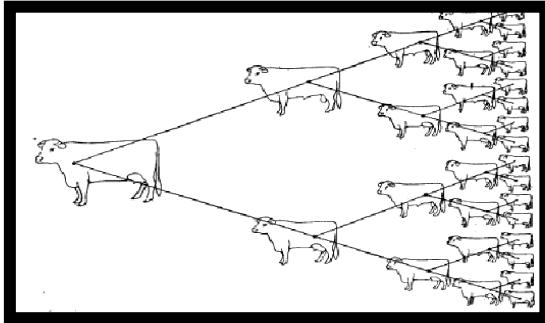
Phenotype = Genotype + Environment



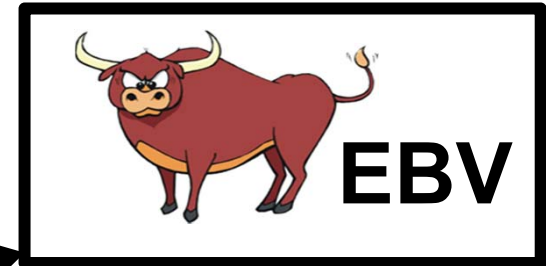
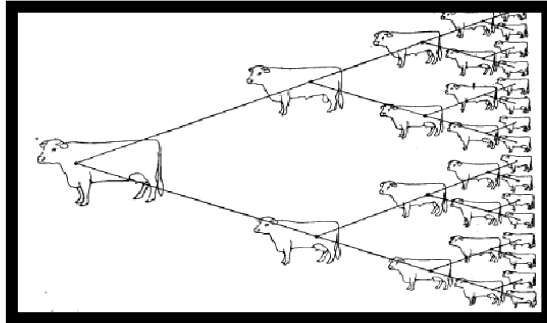
Carcass trait evaluations



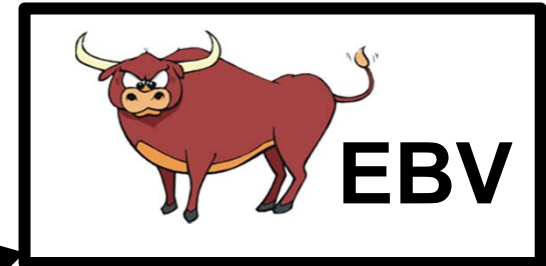
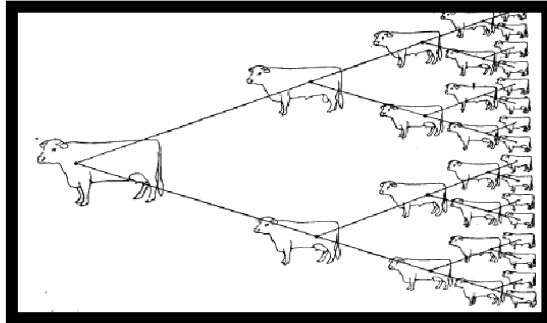
Carcass trait evaluations



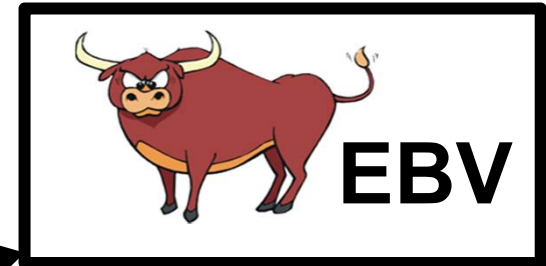
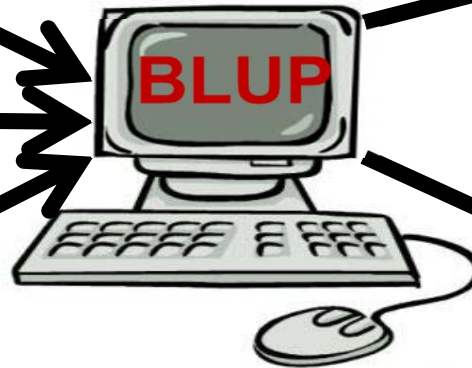
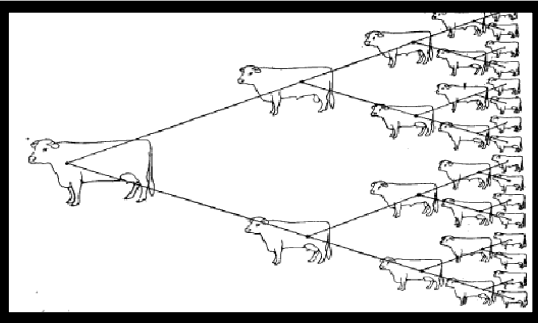
Carcass trait evaluations



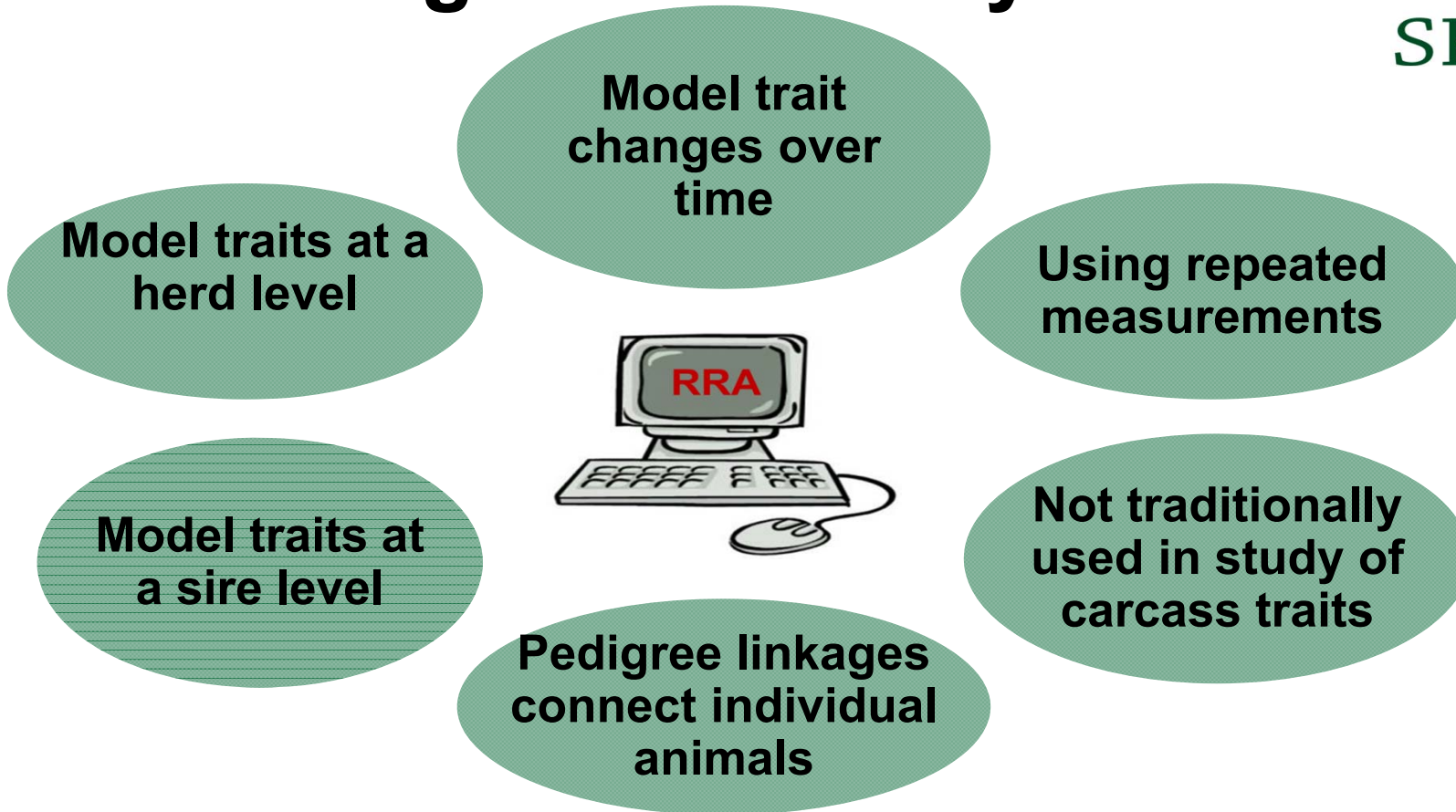
Carcass trait evaluations



Carcass trait evaluations



Random regression analysis



Aims



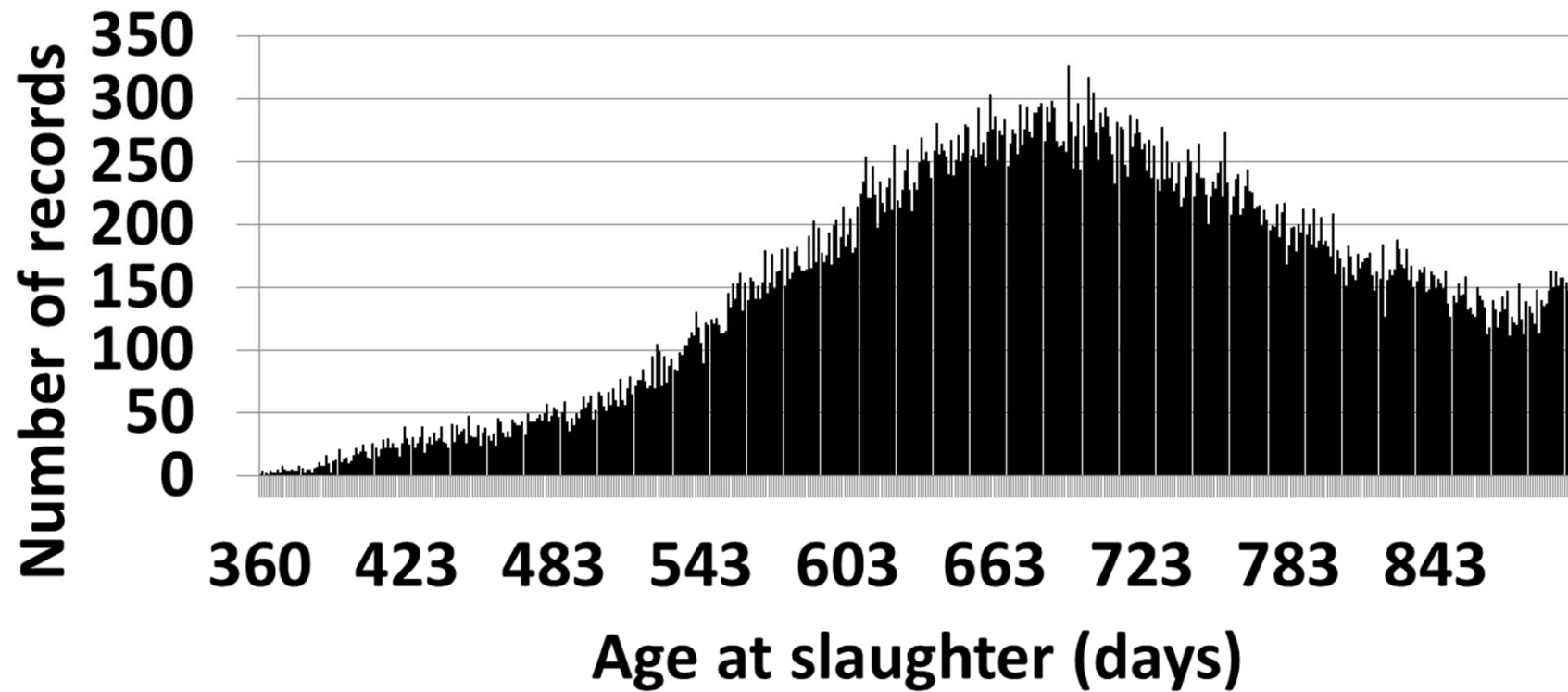
- Quantify the non-genetic and genetic contributions to carcass characteristics
- Generate **herd specific profiles** for carcass traits across age at slaughter
- **Benefit to beef industry**
 - Development of management tools

Materials and methods

- **Carcass records 2003-2013**
- **Multiple beef and dairy breeds**
- **Steers: 360-900 days**
- **Known sire and dam**
- **Sire \geq 5 progeny**
- **Finishing herd-year \geq 5 animals**



Age distribution



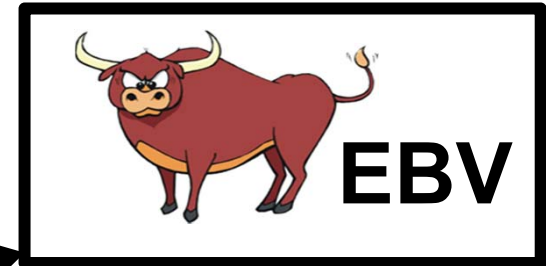
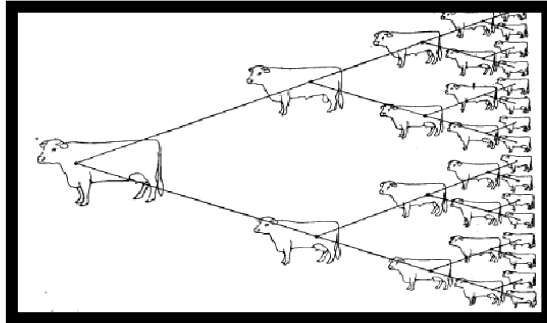
n = 78,790

Random regression model

$$Y = Xb + Za + e$$

- Sire breed
 - Dam breed
 - Heterosis
 - Recombination
 - Parity
 - Abattoir-date of slaughter
 - Age Φ
- Sire*Age Φ • Herd-year*Age Φ

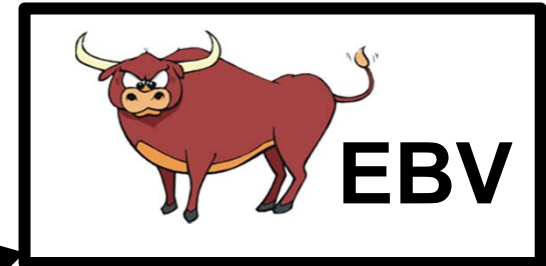
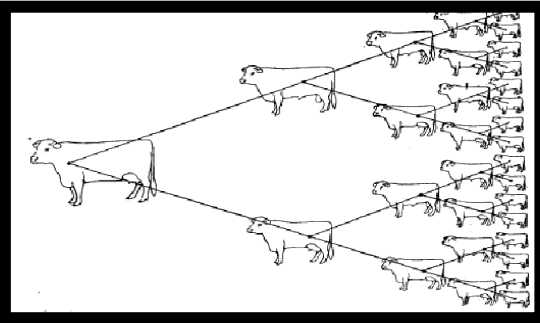
Carcass trait evaluations



Carcass trait evaluations



**Progeny
(78,790)**



Carcass trait evaluations

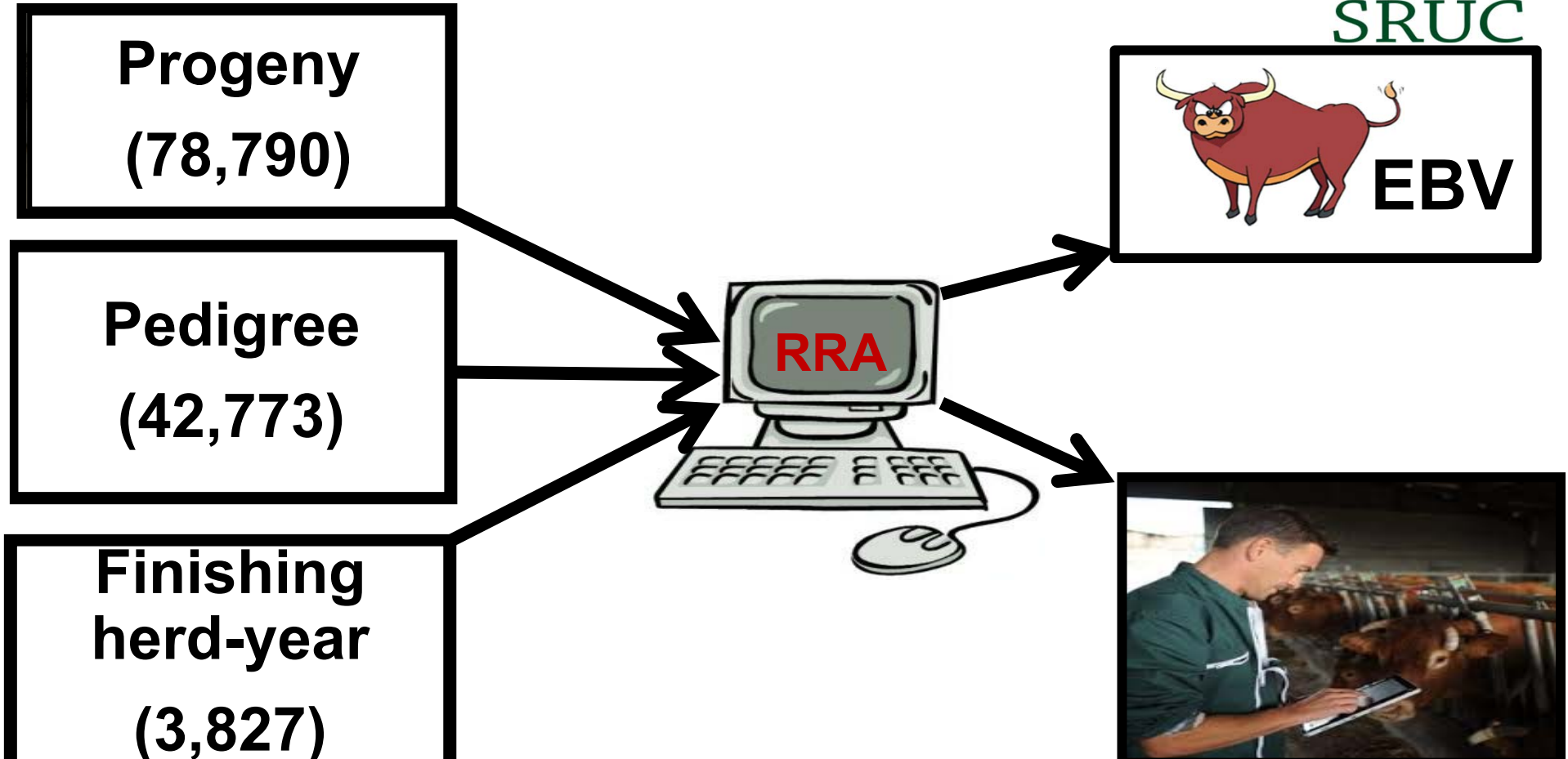


**Progeny
(78,790)**

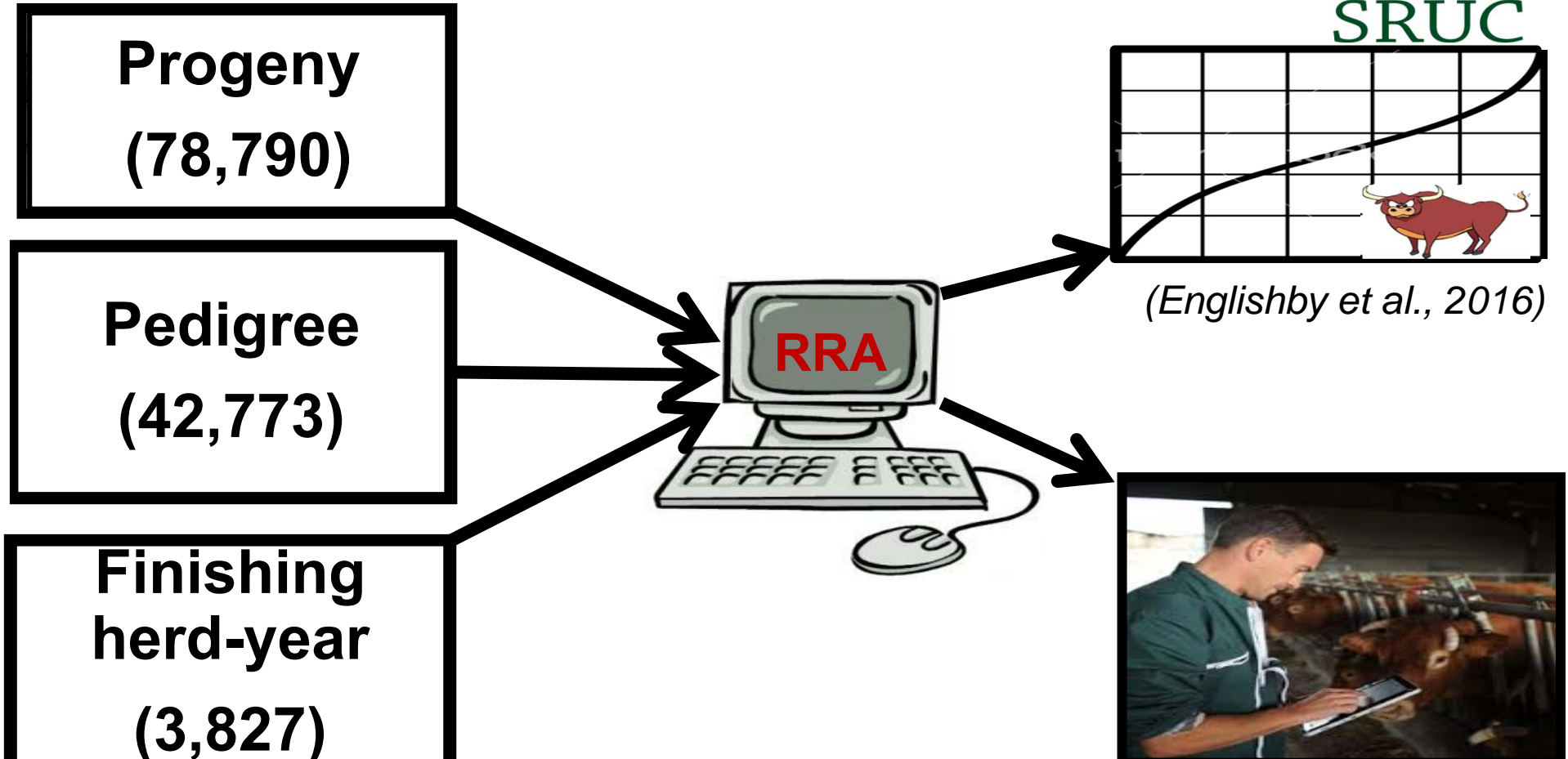
**Pedigree
(42,773)**



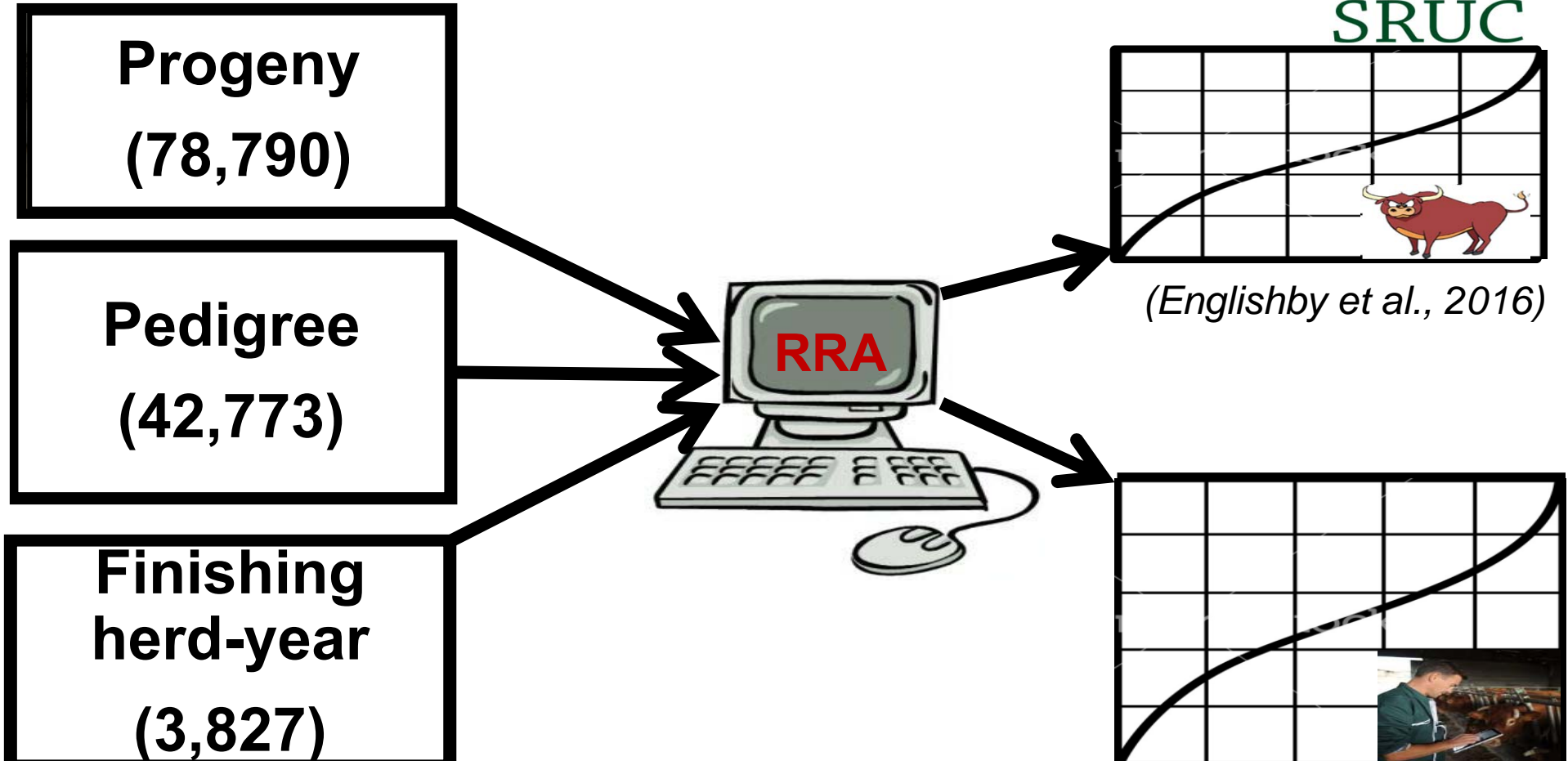
Carcass trait evaluations



Carcass trait evaluations



Carcass trait evaluations



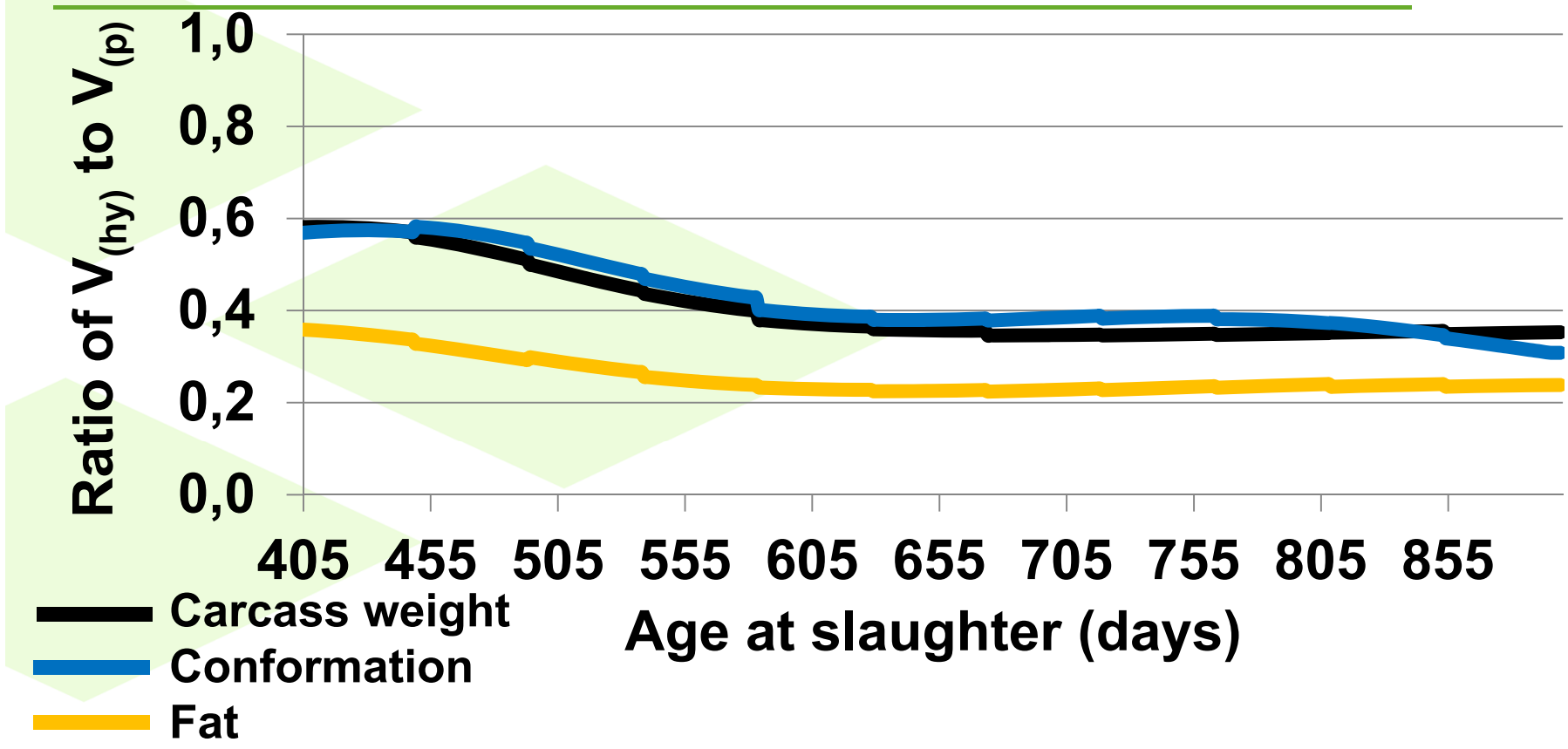
Results



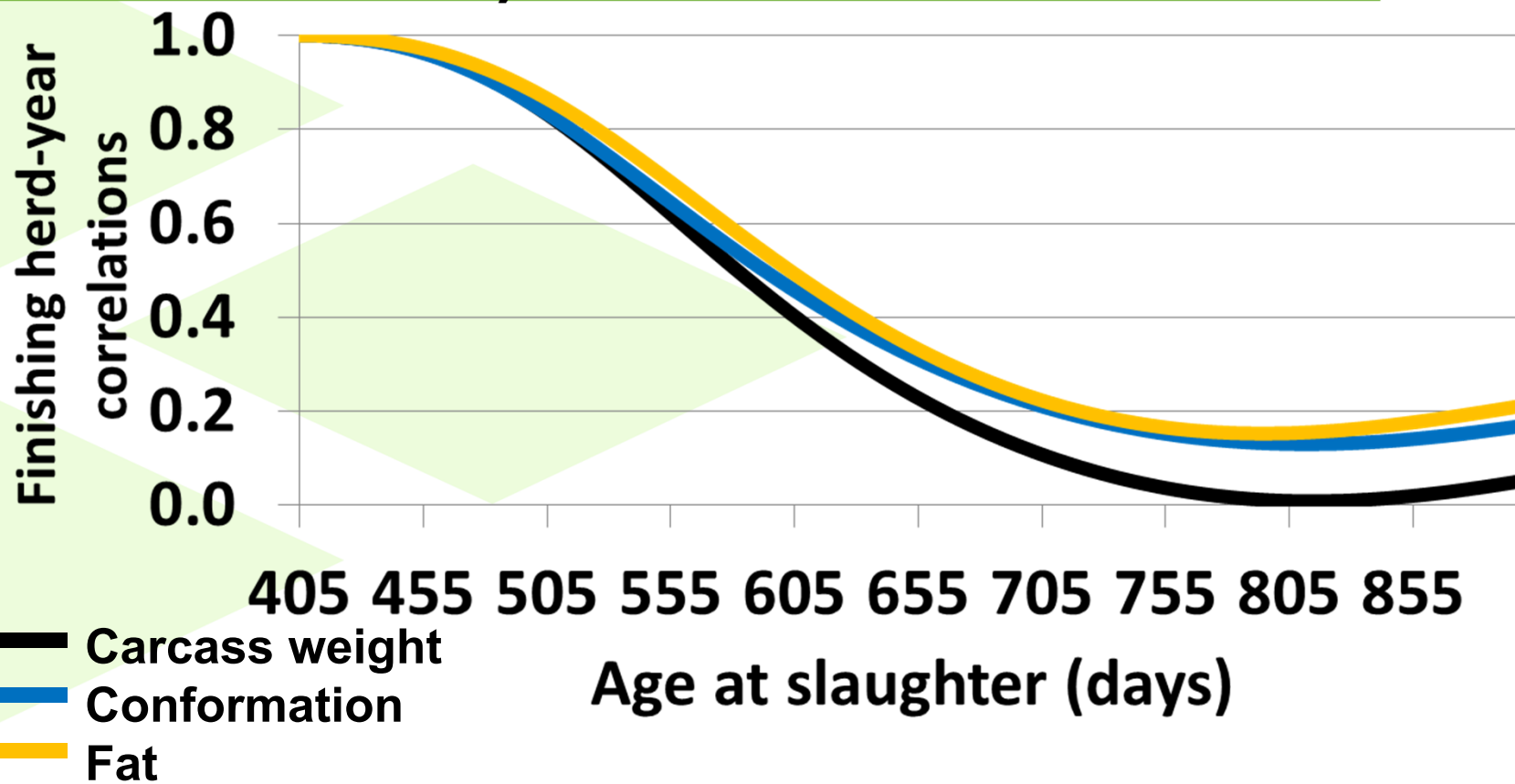
- **Finishing herd-year parameters**
- **Finishing herd-year correlations**
- **Finishing herd-year of slaughter profiles**



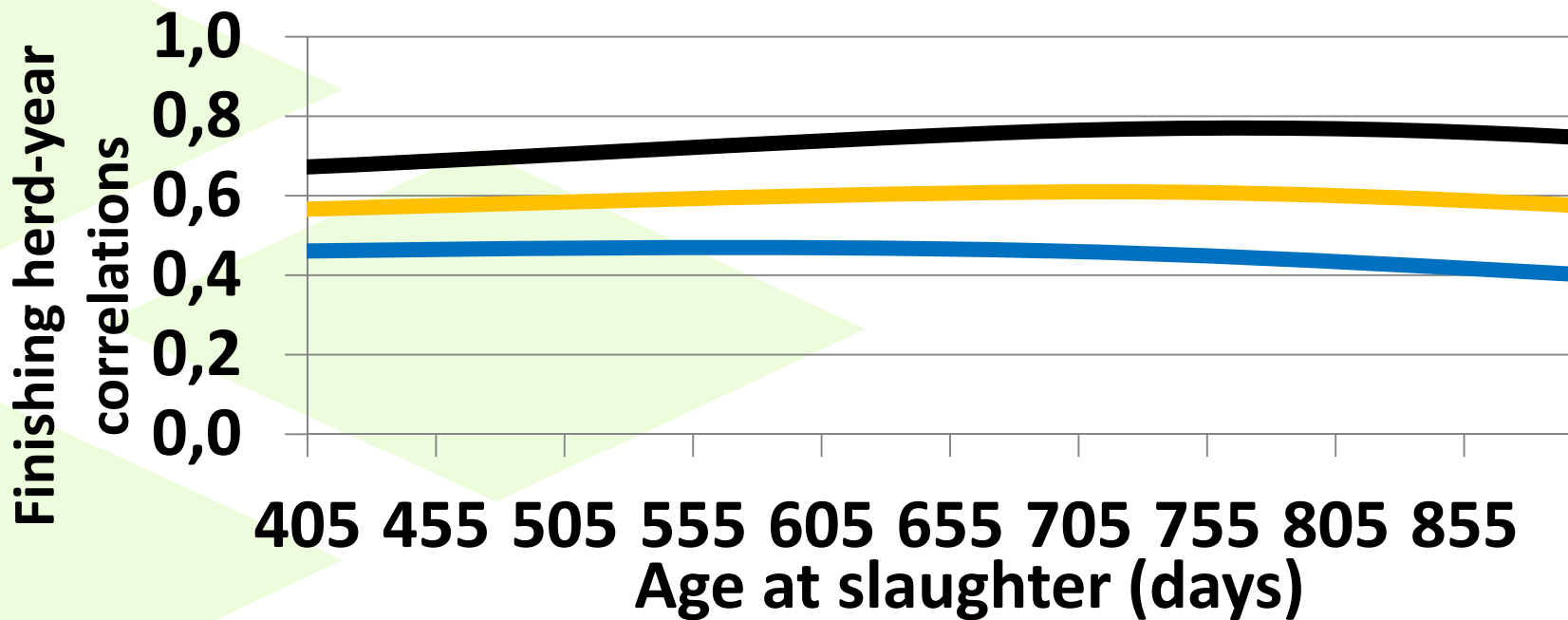
Finishing herd-year parameters



Finishing herd-year correlations (within traits)



Finishing herd-year correlations (between traits)

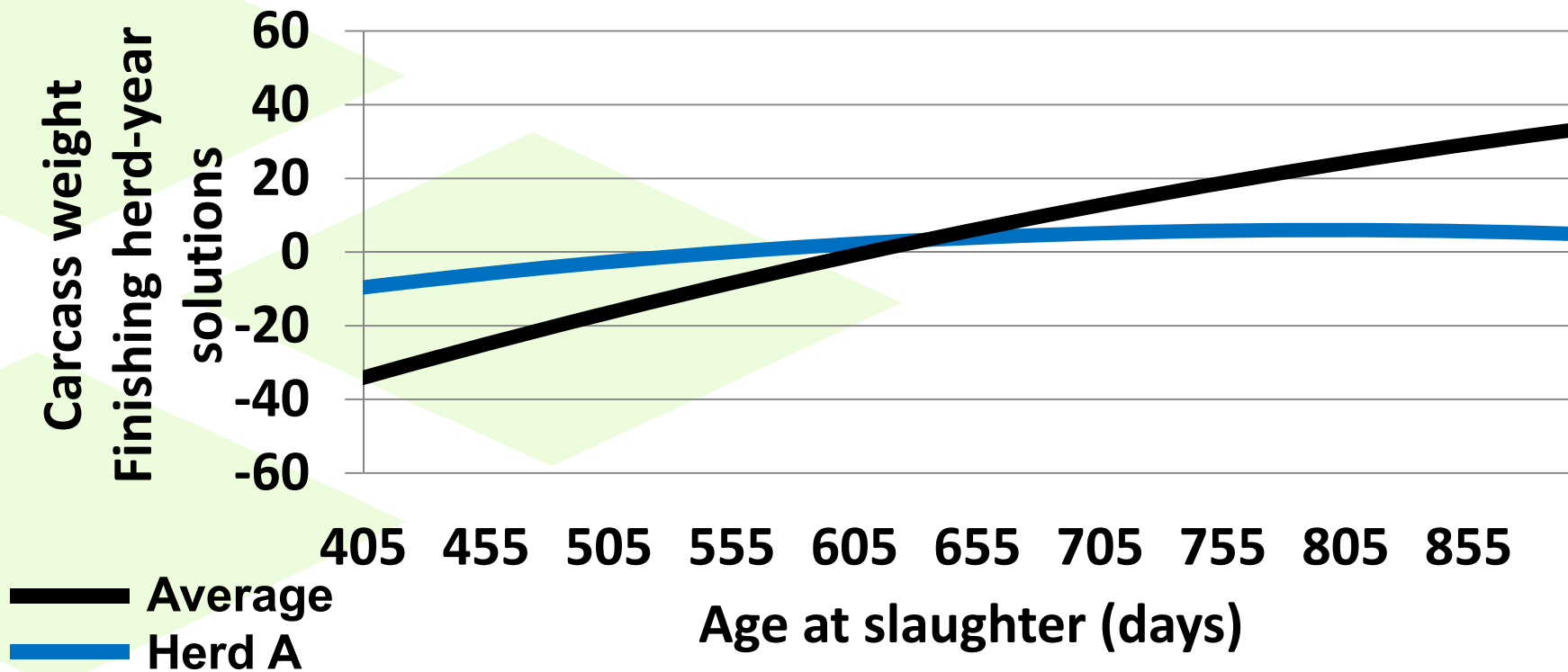


- Carcass weight and conformation
- Conformation and fat
- Fat and carcass weight

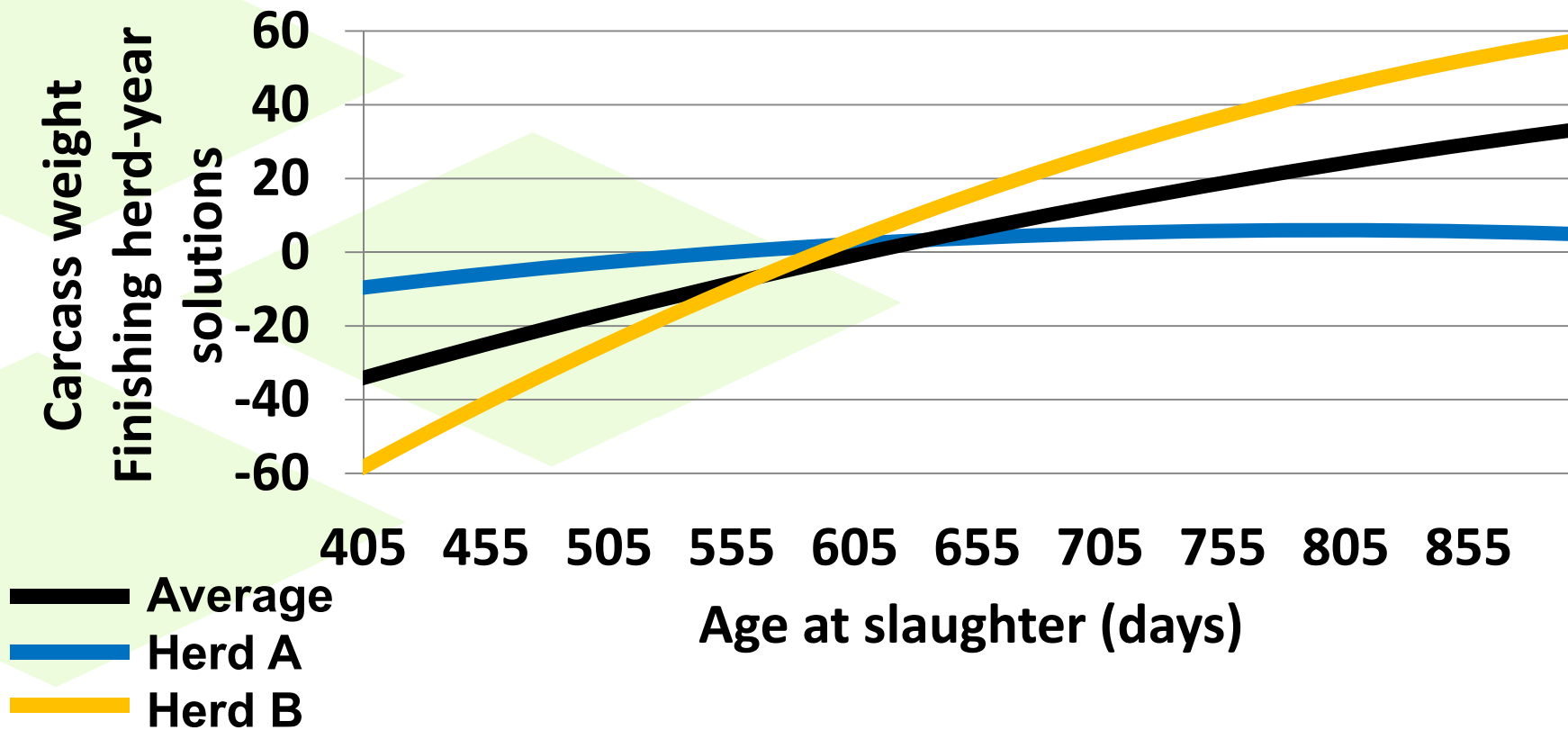
Management tool (across herd)



Management tool (across herd)



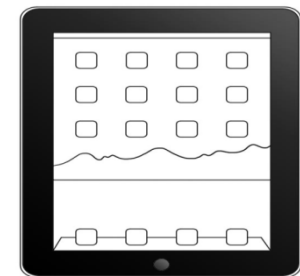
Management tool (across herd)



Practical implications



- **More informed decisions on appropriate time to slaughter**
 - herds specializing in specific slaughter ages
- **Alter management practices in line with market specifications**
- **Produce herd profiles to any given profile**
 - Abattoir
 - Region
- **Herd management web application**



Conclusions



- **Herd environment is an important factor in the variability in carcass traits across ages**
- **Different management practices may be more applicable for differently aged cattle**
- **The output from routine genetic evaluations may be useful in decision support tools.**
 - **Management**
 - **Selection**

Acknowledgments



- **Teagasc Walsh Fellowship Scheme**
- **Supervisors**
 - Georgios Banos
 - Donagh Berry
 - Kirsty Moore
 - Mike Coffey
- Tracey Pritchard
- Ian Archibald
- Sebastian Mucha





Thanks For Listening