Breed Differences for Mature Weight

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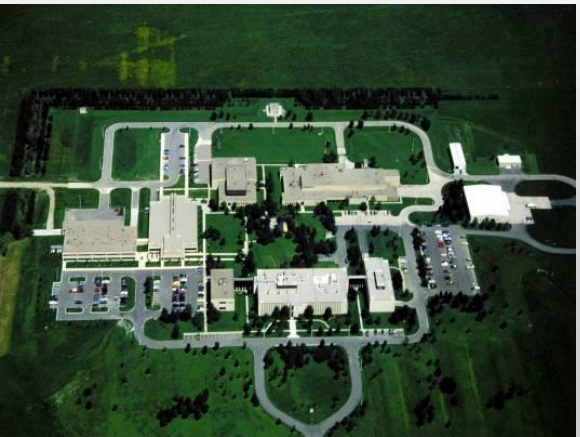

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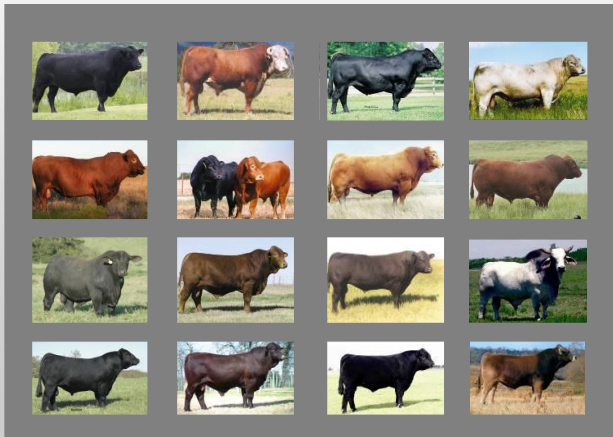


Cow efficiency

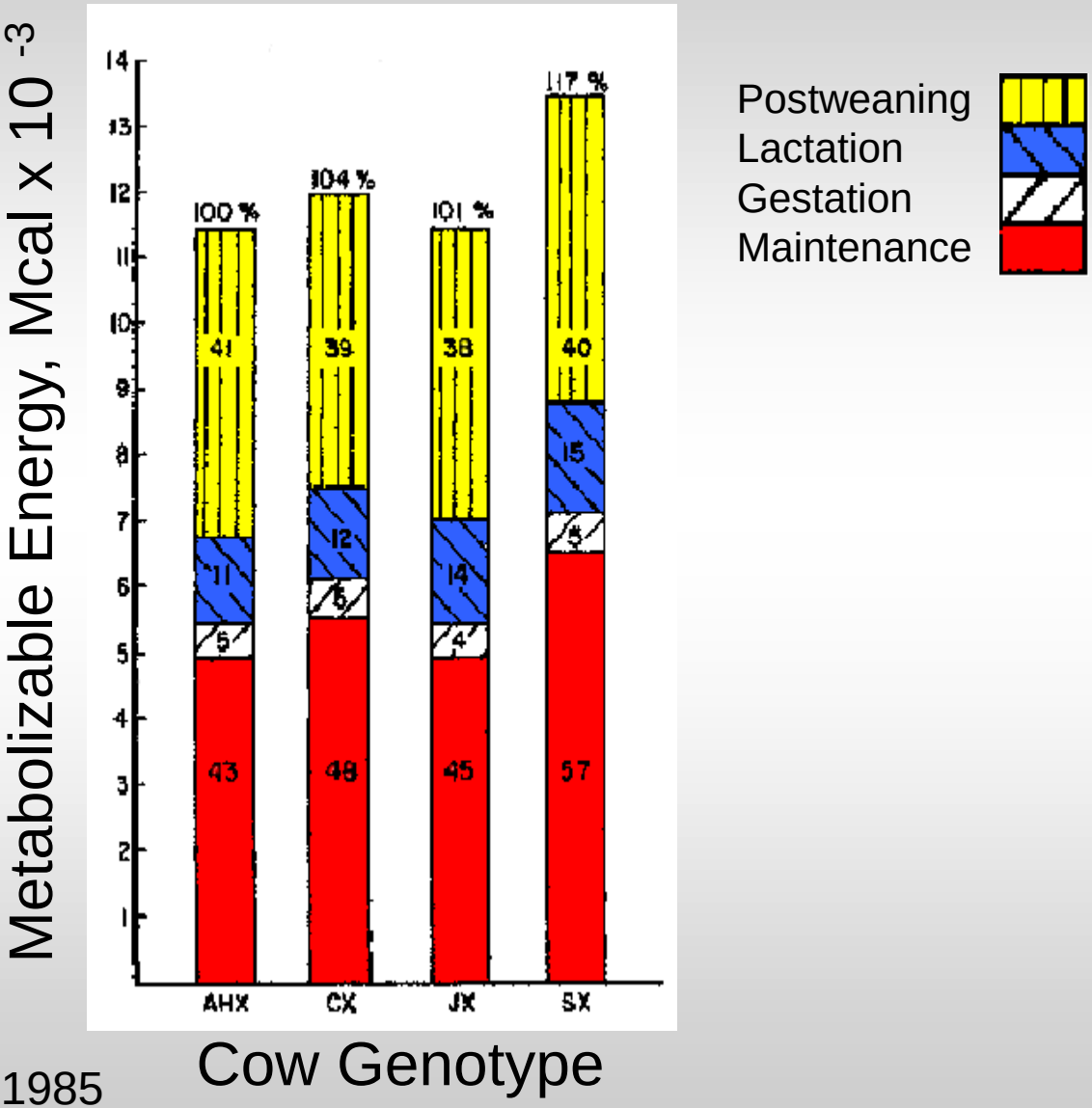
- Everybody wants it
  - But what is it?
  - Could be defined in multiple ways
    - Generally focused on biological efficiency:
      - Calves weaned/cow exposed
      - Calves weaned/(unit energy * cow exposed)
      - Total weaning weight/(unit energy * cow exposed)
    - Most of these measures are ‘population based’
      - Traits on individuals affect expression

Components of cow efficiency

- Fertility
- Cow intake/energy requirements
  - Maintenance, lactation, gestation, immunity
- Calf survival
- Calf growth
- Calf intake
- Longevity

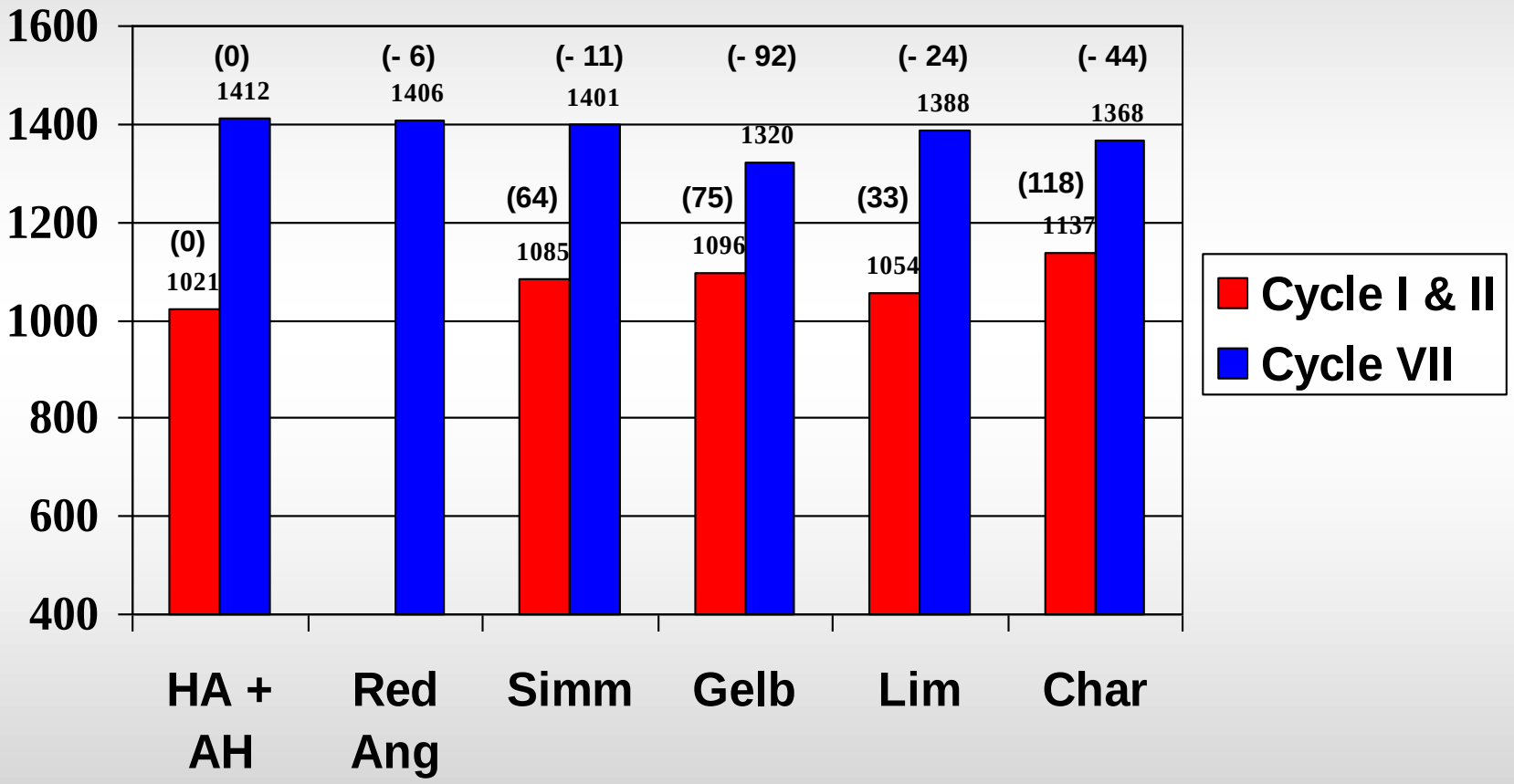
Most predicted by other indirect measures

Estimated Total Metabolizable Energy Required For The Production of Calves to 455 Days of Age

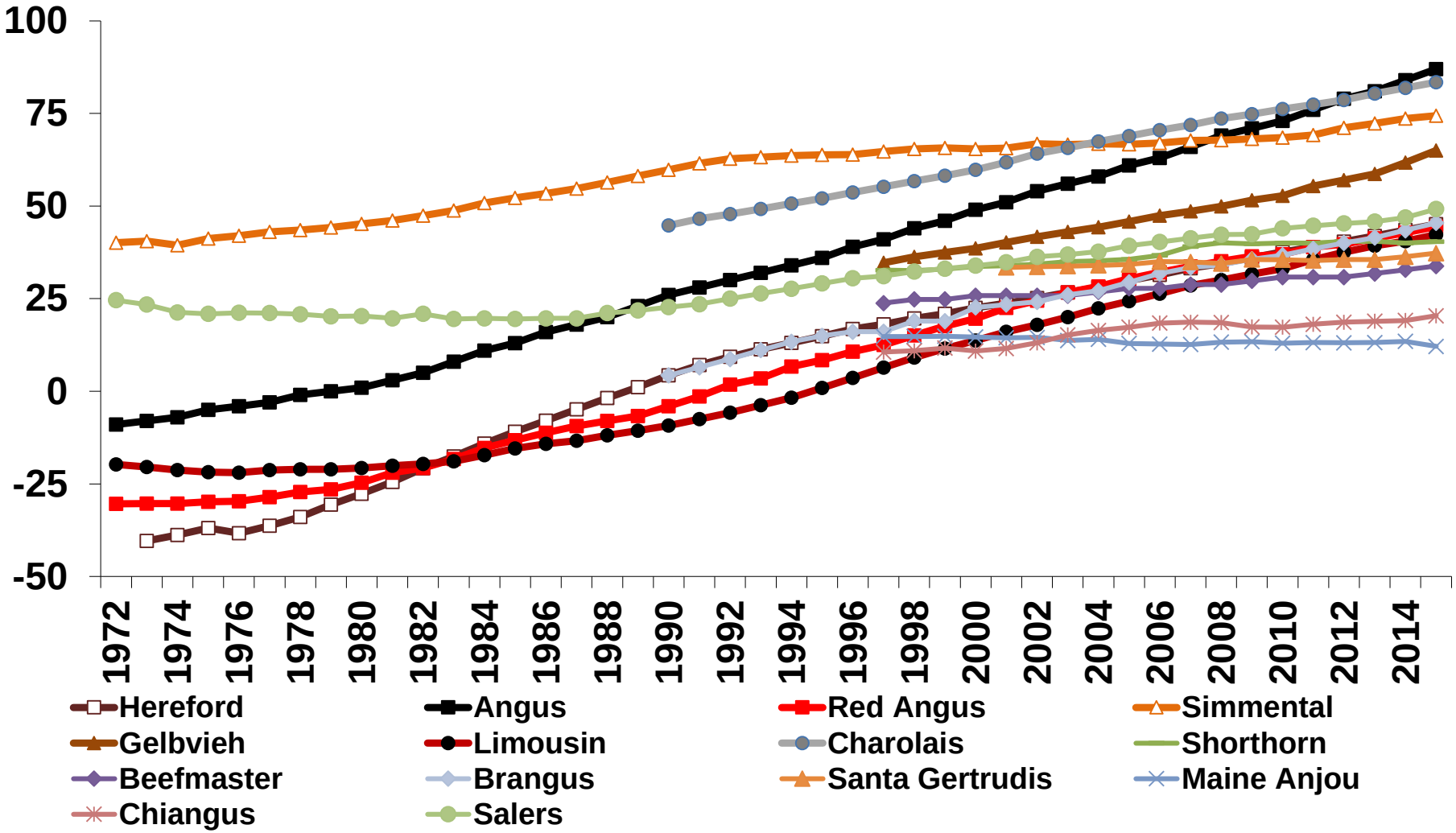


Ferrell and Jenkins, 1985

BREED GROUP MEANS (DEVIATIONS FROM HA & AH) FOR MATURE WEIGHT (ADJUSTED TO CONDITION SCORE OF 5.5) OF F1 CROSS COWS IN CYCLES I AND II (BIRTH YEARS: 1970-74) COMPARED TO CYCLE VII (BIRTH YEARS 1999-2000), LB



Genetic Trends for Yearling Weight, lb



Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

Objective

- Model growth from weaning through maturity
- Use resulting model to predict mature weight
- Estimate breed differences for mature weight

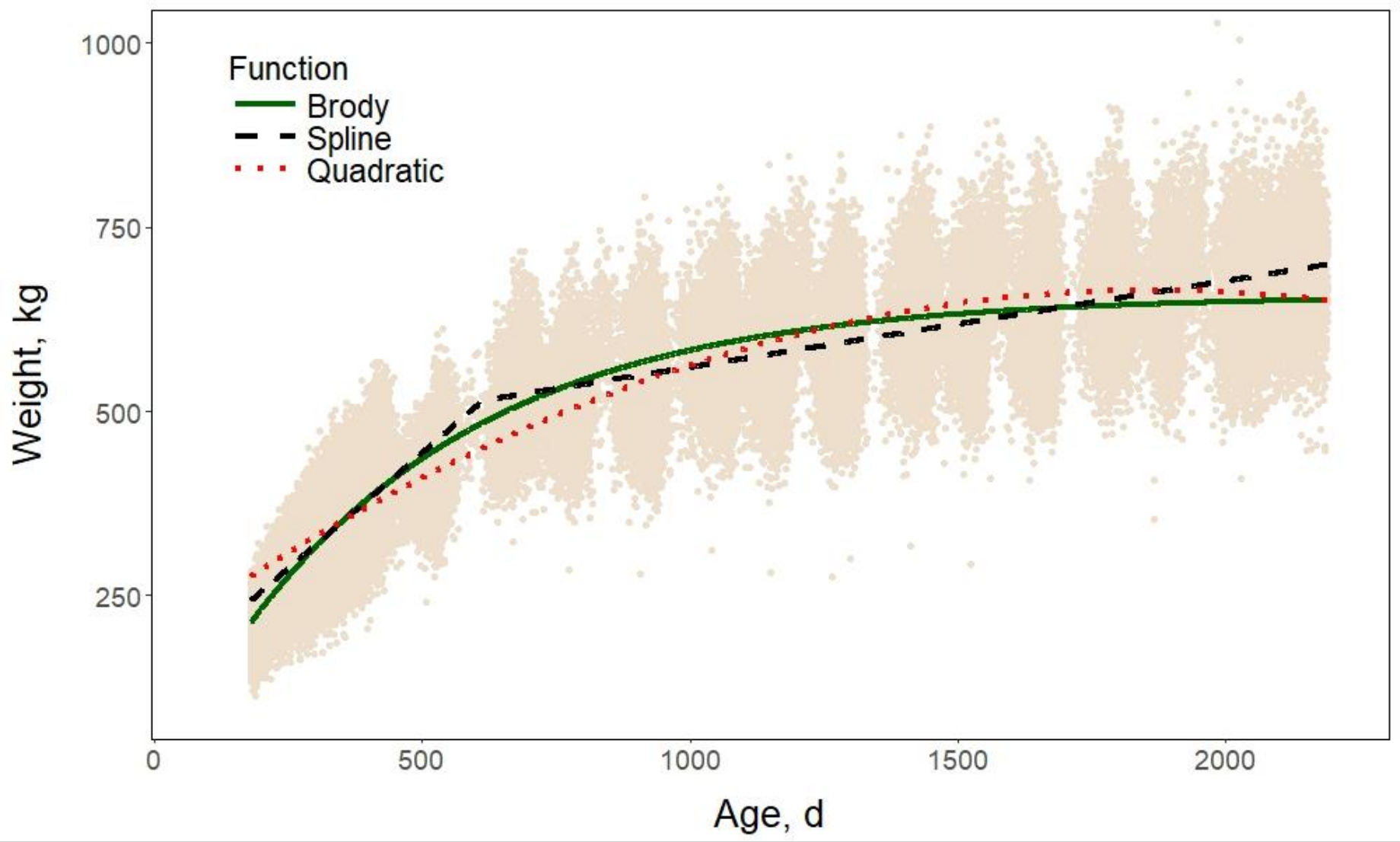
Data source

- USMARC Germplasm Evaluation Program (GPE)
  - Cycle VII – bulls sampled in 1990s
    - More than 2,200 cows
  - Continuous GPE – bulls sampled 2008-2015
    - More than 3,000 cows
  - 18 breeds evaluated
  - Cows weighed 3 times per year in after breeding

Growth modeling

- Brody function
  - Asymptotic non-linear function
    - $W_t = A[1 - \mathrm{e}^{-k(t-t^*)}]$
    - Weight increases at a decreasing weight over time
    - *A* is the asymptotic weight (maturity), *t* is age, *k* is a maturation constant
  - Function with best fit among three compared
    - First fitted with all data
    - Next fitted within each animal

Fitting growth



Within animal models

- Brody parameters estimated for each animal using only their own data
- Weight at 6-yrs of age predicted
  - Defined as mature weight
- 6-yr weight fitted in an animal model
  - Breed effects estimated using breed covariates

Results

- Estimated mature weight
  - Heritability estimated at 0.57
  - Much higher than most growth traits
  - Suggests direct selection could by effectively applied
- Breed differences were adjusted for sampling using YWT EPDs
  - Similar to process using in ABEPD adjustment factors

Mature weight breed of sire differences

Breed	Mature Weight Diff	Breed	Mature Weight Diff
Angus	0.0	Gelbvieh	-60.9
Red Angus	-30.4	Hereford	-7.9
Beefmaster	-57.8	Limousin	-48.3
Brangus	-41.2	Maine Anjou	-27.8
Brahman	-32.4	Salers	-15.7
Braunvieh	-131.9	Santa Gertrudis	-26.7
Chiangus	-40.6	Shorthorn	-62.6
Charolais	-8.4	Simmental	-37.7

Cow Weights

- Some breed differences have moderated while others are larger than at Cycle VII
- Seems to be a real opportunity for breed complementarity
- Selection programs should consider effects of growth on mature weight and subsequent costs

Closing

- Cow herd efficiency remains important at USMARC
  - Much of focus is on cost of maintaining cow herd to increase chance of producing calves each year
  - Measures of income potential continue to be monitored as part of GPE
    - Weight, survival, fertility, longevity, etc.

Acknowledgements

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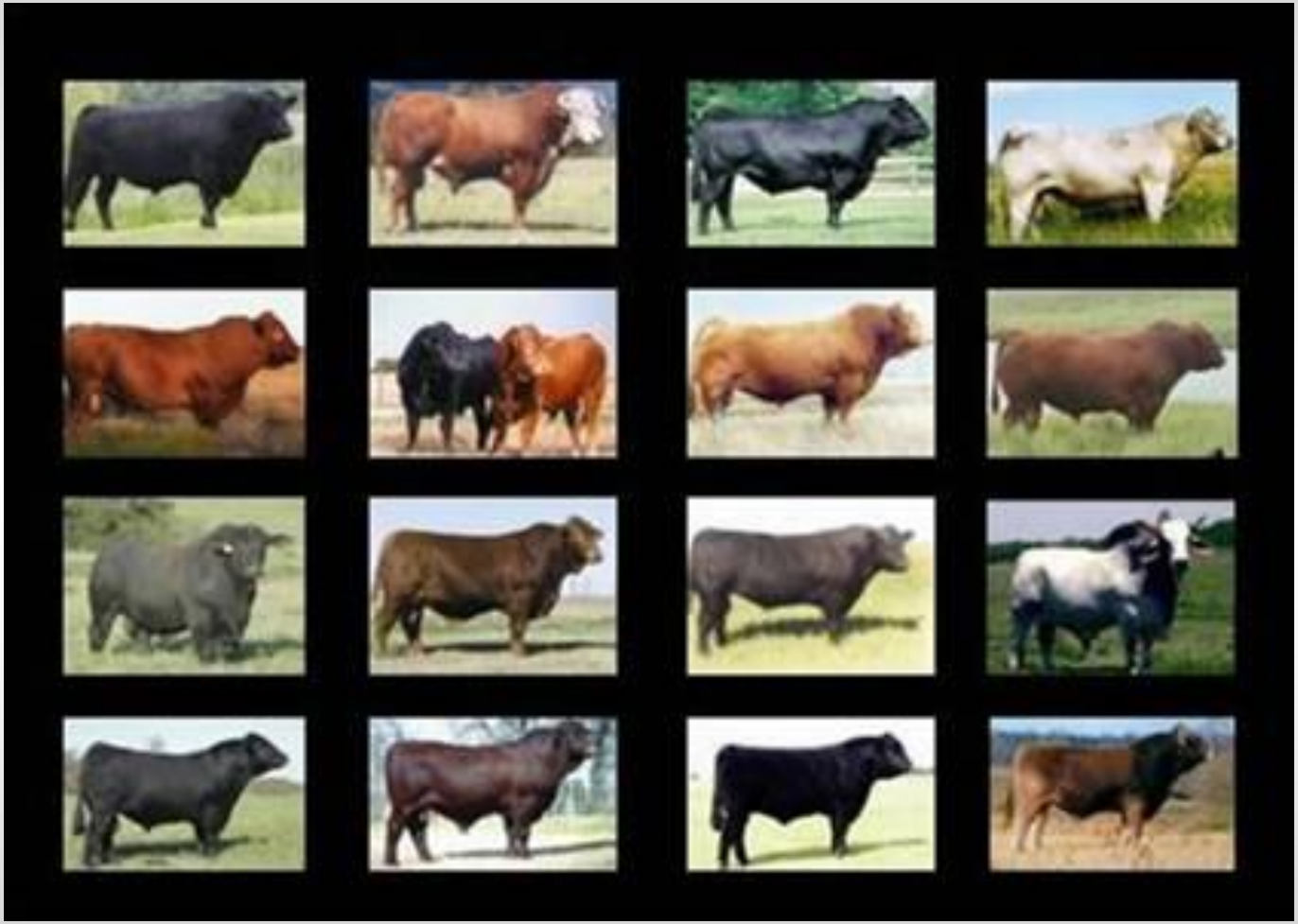
Questions



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