ABACUS BIO LIMITED

Make a difference to food production internationally using science & technology
UK BEEF INDUSTRY: INTEGRATING FEED INTAKE INTO A BREEDING OBJECTIVE

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State of breeding objectives

- Last updated 2005 (Roughsedge et al.)
- Include new traits
  - Carcase
  - Feed intake
- Robust & commercially applicable for UK beef breeds
- Trait-by-trait method
Relative trait importance

<table>
<thead>
<tr>
<th>Sub Index</th>
<th>Trait</th>
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<tbody>
<tr>
<td>Growth</td>
<td>Carcass weight</td>
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<td>Daily Feed intake</td>
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<td>Carcase</td>
<td>Carcase conformation</td>
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<td>Fat score</td>
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<td>Dressing percentage</td>
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<td>Calving</td>
<td>Gestation length - Direct</td>
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<td>- Maternal</td>
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<td>Calving difficulty - Direct</td>
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<td>Maternal</td>
<td>Maternal weaning weight</td>
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<td>Age at first calving</td>
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<td>Lifespan</td>
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<td>Calving interval</td>
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<td>Cow Mature weight</td>
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<td>Autumn body condition score</td>
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## Relative trait importance

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<tbody>
<tr>
<td>Growth</td>
<td>Carcass weight</td>
<td>40.6%</td>
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<td>Daily Feed intake</td>
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<tr>
<td>Carcase</td>
<td>Carcase conformation</td>
<td>4.0%</td>
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<td>Fat score</td>
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<td>Dressing percentage</td>
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<td>Calving</td>
<td>Gestation length - Direct</td>
<td>11.8%</td>
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<td>Maternal</td>
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<td>43.6%</td>
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Selecting for feed efficiency

- Present options for **different definitions** of feed efficiency
  - Total
  - Residual
Total vs. Residual for growth

- Carcase value
- Feed costs
Total vs. Residual for growth

- Farm profit
  - Carcase value
  - Feed costs

- Revenue per +1kg of CW
  - EV for Growth
  - Feed costs associated with growth
Total vs. Residual for growth

Variation in feed NOT associated with growth
Total vs. Residual for growth

- Carcase value
- Feed costs
- EV for Growth
- Revenue per +1kg of CW
- Residual Feed
- Total Feed Intake
How to value growth (CW)?

- Constant slaughter weight
  - Early at same CW
  - Marginal value of feed approaching zero
- Value = feed savings
  - Constant CW means no revenue change
Value of early slaughter

- Total feed intake
  - CW = Early
  - Extra feed costs are captured by Total F.I.

- Residual
  - CW = Early – Growth
  - Residual F.I. measures feed **NOT** captured by growth
Records & accuracy

- Not all energy sinks recorded accurately on all selection candidates

Energy sinks!

- Total Feed Intake
- Residual Feed Intake
- EV for Growth
- EV for Growth
Records & accuracy

• Feed intake
  • Measured in narrow window, on few animals
  • Most animals low accuracy (by pedigree relationship)

• Growth
  • Measured on all animals
  • Most animals very high accuracy (own record)
Records & accuracy

• Residual feed intake more accurate

Energy sinks!
Total Feed Intake

- Impact
  - Underestimate feed costs
  - Over select for growth

- Advantages
  - Simple
  - Referred by farmers

- Terminology
Future work

• Predict response to selection
• Establish feed intake and GHG changes from selection on the index
  • Gross emissions
  • Intensity (emissions per kg output)