20 YEARS OF GENETIC IMPROVEMENT

ICBF and Sheep Ireland genetics conference: ‘Sustainable Farming – Progress through Genetics’
5th of December 2018

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20 years of Genetic Improvement

• Dairy, beef, and sheep
• Value of past improvement
• Key sub-indexes
• Value of future improvement
History/context

• ICBF established 20 years ago
• Initial focus on dairy, motivated industry aware of overseas genetics misfit
• Gaining traction in beef has been tougher
• Sheep Ireland established in 2008
Dairy production value

• Milk and fertility
## Gain by trait (4 cents per litre)

<table>
<thead>
<tr>
<th>Index/ Trait</th>
<th>2003 ave cow</th>
<th>2017 ave cow</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBI (€)</td>
<td></td>
<td></td>
<td>221</td>
</tr>
<tr>
<td>Milk (kg)</td>
<td>5363</td>
<td>5588</td>
<td>225</td>
</tr>
<tr>
<td>Fat (kg)</td>
<td>203</td>
<td>220</td>
<td>17.1</td>
</tr>
<tr>
<td>Protein (kg)</td>
<td>177</td>
<td>191</td>
<td>14.2</td>
</tr>
<tr>
<td>Calving interval (days)</td>
<td>402</td>
<td>399</td>
<td>-2.4</td>
</tr>
<tr>
<td>Survival (percent)</td>
<td>81%</td>
<td>83%</td>
<td>2.0</td>
</tr>
<tr>
<td>Carcase weight (kg)</td>
<td>282</td>
<td>276</td>
<td>-5.6</td>
</tr>
<tr>
<td>Conformation (15 pt scale)</td>
<td>O-</td>
<td>P+</td>
<td>-0.8</td>
</tr>
</tbody>
</table>
Dairy – EBI

• Dairy production benefits worth €1.5b
• Value driven by fertility, then milk.
• Other traits (calving, health) modest

€83 per dairy cow per year
Dairy - Future

- Past = €1.5b
- "Locked in" for next 20 years
- Value = €4.0b
Dairy - Future

- Sustain **10 more years of genetic improvement** at current rate. Then maintain 10 years.
- Value = €2.85b
  - Herd size ~1.45m
Beef production

- Beef production
  - Slaughtered in Ireland
  - Live cattle exports
- Cull cows
- Maternal traits for suckler cows
Beef – Terminal traits

![Graph showing Beef Terminal traits: Conformation, Carcase Wt, and Fat over time from 2003 to 2017.](image)
## Beef – Terminal

<table>
<thead>
<tr>
<th></th>
<th>NPV (€m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef (Terminal)</td>
<td></td>
</tr>
<tr>
<td>Slaughtered in Ireland</td>
<td>464</td>
</tr>
<tr>
<td>Live cattle exports</td>
<td>105</td>
</tr>
<tr>
<td>Total</td>
<td>569</td>
</tr>
</tbody>
</table>

€33 per suckler cow per year
Beef – Replacement index

- Replacement index steady
Beef – Replacement index

- Replacement index steady
- But maternal traits have deteriorated
- Compensated by terminal traits

-€25 per suckler cow per year
**Beef – Past value**

<table>
<thead>
<tr>
<th></th>
<th>Value (€m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef (Terminal)</td>
<td></td>
</tr>
<tr>
<td>Slaughtered</td>
<td>464</td>
</tr>
<tr>
<td>Live cattle exports</td>
<td>105</td>
</tr>
<tr>
<td>Cull cows</td>
<td>31</td>
</tr>
<tr>
<td>Suckler cows (Maternal)</td>
<td>-420</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>180</td>
</tr>
</tbody>
</table>
Beef – A new future

Beef Data & Genomics Programme
Beef – BDGP

Value of new maternal gain from BDGP = €540m

Replacement Index (€)


Maternal
Cull cow
Beef

= €49 / cow
GHG benefits from BDGP

20 years of €10/yr gain in Replacement index = 10% reductions in suckler emissions.
Sheep production

• Terminal index
• Replacement index:
  • Sub-indexes for growth, lambing and maternal
Genetic trend terminal index

- Terminal index value €0.34m
Genetic trend replacement index

- Maternal index value €0.74m
Maternal genetic trends

- Replacement Index
- Lambing
- Growth

€/lamb born


Sheep Ireland
www.sheep.ie

ABACUSBIO LIMITED
Sheep – future benefits

- Value of benefits much greater than past
- Replacement index is driver
  - Rep = €15.5m
  - Term = €2.0m
20 years of Genetic Improvement

• Dairy
  • Past: huge value driven by fertility
  • Future: Focus on health traits

• Beef and sheep
  • Negative maternal trends have been reversed. Other beef industries have failed to do this (NZ, USA, UK, Aus)
  • Maintain momentum (BDGP, and future scheme?)
  • Future: Grow engagement,