The contribution of animal recording to the profitability of Irish farms.

Andrew Cromie, Thierry Pabiou & John McCarthy (ICBF)
Recording, profit & Ireland

- Using Irish cattle breeding as an example.
- Trends in data recording.
- Benefits of data recording;
  - Genetic analysis.
  - Phenotypic analysis.
- Summary.
Genetic Gain in Ireland.

Dairy Economic Breeding Index = Profit/lactation
Beef €uro-Stars = Profit/progeny

Technical Capabilities

Industry Structure

Data Genetic Indexes Breeding programs

Shared Vision Long-term investment

Technical Capabilities

Industry Structure

Data Genetic Indexes Breeding programs

Shared Vision Long-term investment
Increases in data recording.

- ICBF central database.
  - Industry structure.
    - Shared vision & long-term investment.
  - Technical capabilities.
- Growth in milk and beef recording.
Increases in data recording.

Total Animal Records (millions)

- Suckler Cow Welfare Scheme
- Al Company
- Beef Herd Books
- Holstein Friesian & Milk Recording

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Benefits of data recording.

- Genetic trends.
  - Fertility as an example.
  - Dairy Economic Breeding Index
  - Beef Suckler Beef Value
High index Holstein route not the answer

Very disappointing results from three year trial

Eight of the twenty-three empty cows were scanned in calf at 30 days. Embryo losses struck to see the eight repeat near the end of the breeding season.

That’s the hardest pill to swallow for Jack Kennedy, Flor O’Ryan and the rest of the team that put in huge effort into getting the cows in calf. It was hugely disappointing. The cows were well fed since they went out day and night on March 10, and they settled very well,”

said Jack. There was just one embryo loss last year. The biggest problem for them, and for all farmers, is that there is still little known in terms of answers.

Feeding more meals is not the solution. The three-year trial clearly shows that there is no effect of feeding level on fertility.

The 96 cows were split into three herds. Each herd contained half high genetic merit cows (RHI 95-98) and half medium merit (RHI 00-80). The herds were fed either:

- 400 kg meal (low concentrations, LC)
- 40 kg meal (medium concentrations, MC)
- 1500 kg meal (high concentrations, HC)

The average infertility rate for the different levels of meal was 23% per cent, 25% per cent and 23% per cent respectively.

Measures of fertility needed in index

Table 1

<table>
<thead>
<tr>
<th>Year</th>
<th>High merit</th>
<th>Medium merit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>1,498</td>
<td>1,213</td>
</tr>
<tr>
<td>1999</td>
<td>1,675</td>
<td>1,464</td>
</tr>
<tr>
<td>2000</td>
<td>1,770</td>
<td>1,564</td>
</tr>
</tbody>
</table>

Table 2

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RGI</td>
<td>MGI</td>
</tr>
<tr>
<td>88</td>
<td>90</td>
</tr>
<tr>
<td>90</td>
<td>85</td>
</tr>
<tr>
<td>48</td>
<td>57</td>
</tr>
<tr>
<td>42</td>
<td>44</td>
</tr>
<tr>
<td>1.83</td>
<td>1.88</td>
</tr>
<tr>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>50</td>
<td>52</td>
</tr>
</tbody>
</table>

IRISH farmers desperately need an index that includes measures of fertility.

The Moorepark research increases the urgency of the new index being drawn up by the ICBF and due to be released in late November.

For the first time the index will be produced that will include traits linked to fertility.

"Other countries are starting to record traits that are linked to fertility. With our compact calving system the need in Ireland is much greater," said ICBF geneticist Dr.
Fertility: Lack of data cost Irish farmers and industry €800 million over 20 years.

Genetic Trends in EBI, Milk & Fertility Sub-Index

€800m lost profit
EBI: Where we are now. Genetic Gain worth €100m to-date & €270m over next 5 years.

Genetic Trends in EBI, Milk & Fertility Sub-Index

5 year ave = €18/cow/year

-€40.0 -€20.0 €0.0 €20.0 €40.0 €60.0 €80.0 €100.0 €120.0 €140.0

€ profit/progeny

Year of birth

EBI Milk Fertility

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Genetic gain in beef = 20% of gain in dairy.

Figure 1. Genetic trends in Suckler Beef Value and Dairy EBI
Challenges in beef.

- Fragmented industry structure.
  - Lack of “shared vision”.
  - Little evidence of long term investment, e.g., breeding programs.
Benefits of data recording.

- Phenotypic trends.
  - Milk recording.
  - Beef recording.
ICBF & Milk processor report

- Report require shared vision!
- Combines data from:
  - ICBF database (cows, calving....) & milk processor database (milk, fat, protein, SCC)
- Valuable benchmark tool for **ALL** farmers.

### Table 3: Dairygold/ICBF Performance Score Card

<table>
<thead>
<tr>
<th>Milk performance for 2011 (Jan - Dec) based on Dairygold data</th>
<th>Your Herd</th>
<th>Dairygold Average</th>
<th>Dairygold Top 10%</th>
<th>Your Rank out of 100</th>
<th>Your Star Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat + Protein (Kg/cow) Average Fat and Protein yield per cow for your herd</td>
<td>512</td>
<td>448</td>
<td>527</td>
<td>81%</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Litres per Cow per Day Avg litres of Milk per cow from Jan - Dec 2011</td>
<td>17.24</td>
<td>16.02</td>
<td>19</td>
<td>62%</td>
<td>★★★</td>
</tr>
<tr>
<td>Fat % to end December 2011 Weighted average Fat % from Jan - Dec 2011</td>
<td>4.34</td>
<td>3.99</td>
<td>4.19</td>
<td>100%</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Protein % to end December 2011 Weighted average Protein % from Jan - Dec 2011</td>
<td>3.57</td>
<td>3.48</td>
<td>3.57</td>
<td>95%</td>
<td>★★★★★</td>
</tr>
<tr>
<td>Average Milk Price (cpl) Incl. VAT Average milk price received from Jan - Dec 2011, (Includes Bonuses/Penalties, Excludes Levies)</td>
<td>38.6</td>
<td>37.3</td>
<td>39.1</td>
<td>81%</td>
<td>★★★★★</td>
</tr>
<tr>
<td>SCC (.000 cells/ml) The weighted average Somatic Cell Count for Jan - Dec 2011</td>
<td>131</td>
<td>n/a</td>
<td>128</td>
<td>90%</td>
<td>★★★★★</td>
</tr>
</tbody>
</table>

### Fertility & Calving data based on HerdPlus 2011 Calving Report

| Calving Interval (days) Average number of days between successive calvings for cows calved during the period | 434 | 427 | 400 | 43% | ★★ |
| Days to calve 50% of cows Start 21/01/2011 - Median 28/02/2011 | 39 | 48 | 28 | 81% | ★★★★ |
| Total Dairy Replacements Dairy Females born in the period (53) as a proportion of eligible cows (131) | 40% | 39% | 52% | 52% | ★★ |
| %AI bred replacements Female calves born in the period from dairy AI (53) as a proportion of eligible cows (131) | 40% | 28% | 40% | 90% | ★★★★★ |

### EBI Statistics based on the latest HerdPlus EBI report 2012

| Herd EBI (2012) Average EBI for Cows (112) with EBI data | €121 | €71 | €100 | 95% | ★★★★★ |
| Yearly EBI Gain (2012-2013) Gain in Herd EBI based on, 0-1yr old, 1-2yr old & 22% replacement rate | €6 | €4.5 | €9 | 75% | ★★★ |
| EBI of 2011 Inseminations Weighted Average EBI of dairy AI bulls recorded in Sorina 2011 | €201 | €168 | €207 | 87% | ★★★★★ |
Herds included.

- Spring calving herds only.
- Herds broken into 3 groups.
  - Not milk recording (65% herds),
    - <= 1 test/year from 2006-2011.
  - Yes milk recording (32% herds).
    - 4 or more tests/year from 2006-2011.
  - Started milk recording in 2010 (3% herds).
    - 4 or more tests/year in 2010 & 2011.
- Is there difference in performance between these 3 groups of herds?
Analysis undertaken.

- Traits analysed; Milk, fat, protein, SCC & CI Days.
- SAS Proc Mixed & LSMEANS.
- Corrected for in model; year, herd size, region, milk processor, sire genetic merit, breed make-up of herd.

<table>
<thead>
<tr>
<th>Group</th>
<th>Milk kg</th>
<th>Fat kg</th>
<th>Prot kg</th>
<th>SCC</th>
<th>CI Days</th>
<th>€/cow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1NOmr</td>
<td>4454.5</td>
<td>176.9</td>
<td>153.4</td>
<td>264</td>
<td>407.8</td>
<td></td>
</tr>
<tr>
<td>2YESmr</td>
<td>4795.6</td>
<td>192.6</td>
<td>165.9</td>
<td>246.2</td>
<td>404.4</td>
<td>€103.7</td>
</tr>
<tr>
<td>3STAR mr 2010</td>
<td>4680.9</td>
<td>185.9</td>
<td>161.4</td>
<td>250.6</td>
<td>403.2</td>
<td>€93.4</td>
</tr>
</tbody>
</table>

- What are the benefits of milk recording?
  - Compared to “no milk recording”, more F+Pkg, less SCC, better female fertility (~€100/cow/year).
- How much of this is directly due to recording?

- What is the “immediate” benefit of milk recording?

<table>
<thead>
<tr>
<th>Year</th>
<th>No MR Ptn kg</th>
<th>SCC</th>
<th>CI Days</th>
<th>Yes MR Ptn kg</th>
<th>SCC</th>
<th>CI Days</th>
<th>Start MR Ptn kg</th>
<th>SCC</th>
<th>CI Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>143.3</td>
<td>275.6</td>
<td>406.6</td>
<td>156.6</td>
<td>263</td>
<td>402.5</td>
<td>157.7</td>
<td>275.7</td>
<td>406.4</td>
</tr>
<tr>
<td>2010</td>
<td>156.6</td>
<td>271.4</td>
<td>407.5</td>
<td>170.5</td>
<td>250</td>
<td>404.7</td>
<td>165.3</td>
<td>252.2</td>
<td>401.5</td>
</tr>
<tr>
<td>2011</td>
<td>160.3</td>
<td>245</td>
<td>409.4</td>
<td>170.6</td>
<td>226</td>
<td>406</td>
<td>161.1</td>
<td>223.8</td>
<td>401.6</td>
</tr>
<tr>
<td>Diff</td>
<td>17.0</td>
<td>-30.6</td>
<td>2.8</td>
<td>14.0</td>
<td>-36.2</td>
<td>3.5</td>
<td>3.4</td>
<td>-51.9</td>
<td>-4.8</td>
</tr>
</tbody>
</table>

- Bigger reduction in SCC (-22k cells/ml).
- Not clear for other traits.
- Need more data to evaluate true impact of “direct/immediate” effect of recording.
The key question?

• The contribution of animal recording to the profitability of Irish farms.
  – Is it just animal recording, or is there another component?
• Taking similar dataset. Start milk recording herds excluded. 14.0k herds.
  1. Non milk recording herds (67% herds)
  2. Milk recording only (5%)
  3. Milk recording & ICBF HerdPlus (5%)
  4. Milk recording, ICBF HerdPlus & discussion group (new entrant). (10%)
  5. Milk recording, ICBF HerdPlus & discussion group (established participant). (13%)
Data + knowledge = profit.

<table>
<thead>
<tr>
<th></th>
<th>M kg</th>
<th>F kg</th>
<th>P kg</th>
<th>SCC</th>
<th>CI Days</th>
<th>€/cow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No mr</td>
<td>4452.1</td>
<td>176.7</td>
<td>153.3</td>
<td>264.3</td>
<td>407.9</td>
<td></td>
</tr>
<tr>
<td>2. Yes mr</td>
<td>4692.3</td>
<td>186.2</td>
<td>160.3</td>
<td>265</td>
<td>410.7</td>
<td>-€1.4</td>
</tr>
<tr>
<td>3. Yes mr hp</td>
<td>4862.4</td>
<td>193.6</td>
<td>167.7</td>
<td>244.2</td>
<td>403.5</td>
<td>€122.5</td>
</tr>
<tr>
<td>4. Yes mr hp</td>
<td>dg_new</td>
<td>4735.3</td>
<td>189.9</td>
<td>163.5</td>
<td>246.7</td>
<td>403.7</td>
</tr>
<tr>
<td>5. Yes mr hp</td>
<td>dg_estab</td>
<td>4844.1</td>
<td>196.7</td>
<td>169.1</td>
<td>238.7</td>
<td>401.9</td>
</tr>
</tbody>
</table>

- Data on its own is of limited value.
- Data + **knowledge** = profit.
  - Knowledge comes from data + technical support + information sharing + experience..........
- Additional EBI difference of €50/cow = ~€200/cow.
Is there similar evidence from beef?

- Carcass weight & value data.
  - 634k animal records from 29.4k herds.
- SAS Proc Mixed & LSMEANS.
  - Correcting for carcass type, breed, sire genetic merit, year, dam age, herd size, parity.
- Four herd groupings identified.
  - No recording,
  - Suckler Cow Welfare scheme (SCWS)
  - SCWS + HerdPlus
  - SCWS + HerdPlus + weight recording.
- Is there any variation in performance?
Data + knowledge = profit.

- Similar trends for beef.
  - Knowledge comes from data + technical support + information sharing + experience…
- Additional SBV difference of €20 = €100/animal slaughtered.

<table>
<thead>
<tr>
<th>Herds</th>
<th>Animals</th>
<th>Carc wt</th>
<th>Carc Value</th>
<th>€/anim</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No recording</td>
<td>4,792</td>
<td>75,544</td>
<td>341</td>
<td>€1,076</td>
</tr>
<tr>
<td>2. SCWS</td>
<td>18,325</td>
<td>363,828</td>
<td>348</td>
<td>€1,106</td>
</tr>
<tr>
<td>3. SCWS hp</td>
<td>5,856</td>
<td>167,716</td>
<td>352</td>
<td>€1,119</td>
</tr>
<tr>
<td>4. SCWS hp wr</td>
<td>509</td>
<td>26,252</td>
<td>363</td>
<td>€1,155</td>
</tr>
</tbody>
</table>

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How do we create knowledge?

Dairy Economic Breeding Index = Profit/lactation
Beef €uro-Stars = Profit/progeny

KNOWLEDGE CREATION

Technical Capabilities

Data
Genetic Indexes
Breeding programs

Industry Structure

Shared Vision
Long-term investment

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Knowledge creation in Ireland.

- ICBF (vision, leadership, systems.....)
- Teagasc (Research, B&T, discussion groups.....).
- Department of Agriculture (Suckler cow welfare scheme, Beef Technology Adoption programs.....).
- Service providers (industry meetings, key staff, technicians....)
- Wider industry (milk & meat processors, Animal Health Ireland, Irish Farmers Journal........)
Summary.

- The level of animal recording in Ireland has increased dramatically over past 10 years.
  - ICBF database (shared vision).
- Compelling evidence that data + knowledge = increased profitability.
  - €200/cow in dairy (€200m across industry).
  - €100/animal in beef (€150m across industry).
- The challenge for Ireland going forward. To continue increases in data recording and ensure greater knowledge creation across the industry.