BDGP & BEEP
Breeding for a sustainable suckler cow
Alan Twomey
16/01/'20
The profitability challenge.

(Dillon, 2019)
The environmental challenge.
What is the Replacement index?

- Aid beef farmers in the selection of more profitable breeding animals

What do the star ratings mean?

- Rep index

<table>
<thead>
<tr>
<th>Trait</th>
<th>Economic Weight (€ Unit)</th>
<th>Trait Emphasis</th>
<th>Trait Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Calving Difficulty</td>
<td>-4.98</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Age 1st Calving</td>
<td>-0.99</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Calving Interval</td>
<td>-5.07</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Survival</td>
<td>8.86</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>5.58</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Heifer Intake</td>
<td>-0.76</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Cow Intake</td>
<td>-0.55</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Cow Docility</td>
<td>77.27</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Cull Cow Weight</td>
<td>0.91</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Calving Difficulty</td>
<td>-5.12</td>
<td>7%</td>
<td></td>
</tr>
<tr>
<td>Gestation</td>
<td>-2.48</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>Mortality</td>
<td>-5.87</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Docility</td>
<td>14.72</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Feed Intake</td>
<td>-0.07</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Carcass Weight</td>
<td>2.1</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Carcass Conformation</td>
<td>10.22</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Carcass Fat</td>
<td>-5.44</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>
Since 2000, large genetic gain in dairy
- 0.1 GSD/year

Prior to BDGP, little gain in Rep index
- 0.01 GSD/year

Since BDGP, Rep index and EBI equal genetic gain
- 15 year lag
### BDGP heifers calved in 2017

<table>
<thead>
<tr>
<th>First genomic evaluation 2016</th>
<th>Number</th>
<th>5 ⭐</th>
<th>4 ⭐</th>
<th>3 ⭐</th>
<th>2 ⭐</th>
<th>1 ⭐</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 ⭐</td>
<td>20,931</td>
<td>52</td>
<td>24</td>
<td>14</td>
<td>7</td>
<td>3</td>
</tr>
</tbody>
</table>
Prediction of today’s evaluation

R = 0.70
But does is it work?

- **Validation dataset**
  - All cows born in 2012 and 2013 were retained
  - National evaluation from 2013 was used to predict there performance
    - No cow had a calving event prior to the 2013 evaluation
    - Estimated using ancestry

- Estimate the performance of animals within each star rating
Analysis

- All animals were corrected to a common animal relative to the trait analysed.

Cow traits
- Purebred cow (no hybrid vigour)
- Parity 3 cow (except AFC)
- 12 months since DSC (only carcass traits)
- Common contemporary group

Progeny traits
- Purebred cow and animal
- Parity 3 cow
- 24 month steer (For age of slaughter 360Kg 3= steer)
- Common sire
- Common contemporary group
Fertility and calving difficulty

- **Survival**: 4% higher
  - Rep star 1: 80%
  - Rep star 2: 82%
  - Rep star 3: 84%
  - Rep star 4: 86%
  - Rep star 5: 88%

- **Age at 1st calving**: 10 days younger
  - Rep star 1: 992
  - Rep star 2: 990
  - Rep star 3: 988
  - Rep star 4: 986
  - Rep star 5: 984

- **Calving interval**: 2 days shorter
  - Rep star 1: 992
  - Rep star 2: 990
  - Rep star 3: 988
  - Rep star 4: 986
  - Rep star 5: 984

- **Calving difficulty**: 4% lower
  - Rep star 1: 12%
  - Rep star 2: 11%
  - Rep star 3: 10%
  - Rep star 4: 9%
  - Rep star 5: 8%
Carcass weight of cows

**Weight**
- Weight decreases with increasing Rep star.
- Rep star 1 is 10 kg lighter than Rep star 5.

**Conformation**
- Conformation decreases with increasing Rep star.
- Rep star 5 is 0.5 unit lower than Rep star 1.

**Fat score**
- There is no significant difference in fat score across Rep stars.

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[Graphs showing weight, conformation, and fat score changes across Rep stars.]
Carcass weight of progeny

Weight, kg:
- Rep star 1: 372
- Rep star 2: 377
- Rep star 3: 382
- Rep star 4: 387
- Rep star 5: 392

1.5 kg lighter

Fat score:
- Rep star 1: 8.5
- Rep star 2: 9.0
- Rep star 3: 9.5
- Rep star 4: 10.0
- Rep star 5: 10.5

0.1 units higher

Conformation:
- Rep star 1: 768
- Rep star 2: 770
- Rep star 3: 772
- Rep star 4: 774
- Rep star 5: 776

No difference

Weight:
- Rep star 1: 8.0
- Rep star 2: 8.2
- Rep star 3: 8.4
- Rep star 4: 8.6
- Rep star 5: 8.8

1.5 kg lighter

Fat score:
- Rep star 1: 782
- Rep star 2: 780
- Rep star 3: 778
- Rep star 4: 776
- Rep star 5: 774

6 days younger

Age, d:
- Rep star 1: 770
- Rep star 2: 772
- Rep star 3: 774
- Rep star 4: 776
- Rep star 5: 778

6 days younger
Beef Environmental Efficiency Program

- Launched in January 2019
- Benefits
  - Measure milk ability of cows (measured by weaning weights) and cow live-weights
  - Improves reliability of breeding values
  - Identify the most efficient cows
What is an efficient cow?

- A cow with a low economic and environmental cost but produces a high value calf
  - ↓ cow weight = ↓ intake = ↓ methane emissions

<table>
<thead>
<tr>
<th>Cow A</th>
<th>Cow B</th>
</tr>
</thead>
<tbody>
<tr>
<td>650kg</td>
<td>650kg</td>
</tr>
<tr>
<td>300kg</td>
<td>280kg</td>
</tr>
</tbody>
</table>
Do small cows produce small calves?

- 10 kg ↓ in cow live-weight = 1 kg ↓ in weaning weight
- Replacement index identifies the efficient cows (outliers)
Improvement observed in all breeds

Cow live-weight

Weaning weight
Conclusion

- Large genetic progress being achieved since BDGP
- Replacement index is improving maternal traits
  - Little or no impact on carcass performance
- Replacement index identifies cows more environmentally friendly