Breeding for Tuberculosis and Liver Fluke Resistance

Siobhán Ring
Irish Angus Meeting, 7th February 2019
Observing genetic variation

<5% of these sires progeny were diagnosed with TB despite being in multiple herds with TB infection

30-40% of these sires progeny were diagnosed with TB

Liver Fluke

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Breeding more resistant cattle

- Genetics is responsible for some of the on-farm prevalence of TB & fluke! ...Also, responsible for some resistance
- TB reactors: 26% more prevalent in worst Vs best genetic merit
- Liver fluke: 17% more prevalent in worst Vs best genetic merit

Optimum use of breeding values
More info...

1. Log on to [www.icbf.com](http://www.icbf.com)
2. Press ‘Genetic Evaluations’
3. Press ‘TB & Liver Fluke’
4. Download the proofs by selecting from the available options
Siobhán Ring
Irish Angus Meeting, 7th February 2019
Motivation for a Dairy Beef Index

- Births from dairy herd increasing (+414 k)
- 72% more beef*dairy births (+275 k), & increased peak
- Focus on easy calving & short gestation beef
  - Carcass quality at risk
- Calves from dairy herd not meeting factory spec
  - Animal value & sector sustainability
Performance of dairy bred beef

- Avg. dairy*dairy not hitting weight or carcass spec
- Avg. dairy*beef female just hitting weight spec
- 50% progeny above and below bar
Out of spec: dairy bred beef

<table>
<thead>
<tr>
<th>Sire breed</th>
<th>Number of sires</th>
<th>Number of progeny</th>
<th>Progeny not meeting carcass weight spec (280 kg)</th>
<th>Progeny not meeting carcass conformation spec (O=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aberdeen Angus</td>
<td>35</td>
<td>2,309</td>
<td>32%</td>
<td>12%</td>
</tr>
<tr>
<td>Belgian Blue</td>
<td>29</td>
<td>2,405</td>
<td>8%</td>
<td>2%</td>
</tr>
<tr>
<td>Hereford</td>
<td>31</td>
<td>1,251</td>
<td>27%</td>
<td>17%</td>
</tr>
<tr>
<td>Limousin</td>
<td>25</td>
<td>4,834</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>Friesian</td>
<td>117</td>
<td>2,066</td>
<td>26%</td>
<td>51%</td>
</tr>
<tr>
<td>Holstein</td>
<td>509</td>
<td>957</td>
<td>31%</td>
<td>74%</td>
</tr>
<tr>
<td>Jersey</td>
<td>50</td>
<td>244</td>
<td>66%</td>
<td>84%</td>
</tr>
<tr>
<td>Norwegian Red</td>
<td>10</td>
<td>168</td>
<td>29%</td>
<td>62%</td>
</tr>
</tbody>
</table>
Need a Dairy Beef Index that..

- Balanced between calving ease and carcass merit
- **Scientifically sound, robust & defendable**
- Facilitates identification of beef bulls suitable for dairy heifers
- Incentivises beef breeders to target dairy industry as a market
- Incentivises beef breeders targeting dairy farmers to record appropriate traits accurately
What is the Dairy Beef Index?

- Breeding goal for dairy and beef farmers
- Promote high quality beef cattle bred from the dairy herd

**Benefits**

1) Identifies easy calving & short gestation beef bulls with high carcass merit
2) Progeny are more saleable as calves & profitable at slaughter
3) Minimal consequences on dairy cow calving difficulty or gestation
   - Knock-on effects on cow fertility, milk production, & health
What does the Dairy Beef Index select for?

- High € values for calving sub-index (64% of DBI)
  - Shorter gestation lengths
  - Easy calving
  - Less calf mortality

- High € values for beef sub-index (36% of DBI)
  - Less feed consumption
  - High carcass weight & conformation
  - Low carcass fat
  - Meet factory spec. for weight & conformation

- Each €1 increase in Dairy Beef Index can be interpreted as a €1 expected increase in profit for that bull’s progeny compared to progeny born to the average Holstein-Friesian bull
Relative emphasis

- Calving difficulty (heifer/cows), 53%
- Carcass weight, 17%
- Feed intake, 5%
- Docility, 1%
- Calf mortality, 1%
- Carcass fat, 1%
- Carcass conformation, 6%
- Polledness, 3%
- Carcass bonus, 3%
- Gestation length, 10%

ICBF.com
BREEDING HIGH QUALITY BEEF CATTLE FROM THE DAIRY HERD
AgTech – it’s in our DNA
### Progeny performance comparison

<table>
<thead>
<tr>
<th>Bull</th>
<th>Top beef AI bulls on DBI€</th>
<th>Most used beef AI bulls</th>
<th>Difference between progeny</th>
<th>Value of difference on-farm</th>
<th>Overall value of using the top bulls over the most used bulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBI (€)</td>
<td>100</td>
<td>43</td>
<td>€57 higher DBI</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**VALUE TO DAIRY FARMER**

<table>
<thead>
<tr>
<th></th>
<th>Top beef AI bulls</th>
<th>Most used beef AI bulls</th>
<th>Difference</th>
<th>Value to dairy farmer</th>
<th>Overall value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestation length (days)</td>
<td>284</td>
<td>283</td>
<td>1 day longer gestation</td>
<td>-€7.47</td>
<td>-£9.67</td>
</tr>
<tr>
<td>Calving difficulty on dairy heifers (%)</td>
<td>9</td>
<td>8</td>
<td>Assist an extra 1% of heifers at calving</td>
<td>-€6.44</td>
<td>-£6.44</td>
</tr>
<tr>
<td>Calving difficulty on dairy cows (%)</td>
<td>3</td>
<td>4</td>
<td>Assist 1% fewer cows at calving</td>
<td>€5.58</td>
<td>€5.58</td>
</tr>
<tr>
<td>Calf mortality (%)</td>
<td>2</td>
<td>2</td>
<td>No difference in calf mortality</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Calf price (£)</td>
<td>242</td>
<td>224</td>
<td>€18 higher calf price</td>
<td>€18.00</td>
<td>€18.00</td>
</tr>
</tbody>
</table>

**VALUE TO FINISHER**

<table>
<thead>
<tr>
<th></th>
<th>Top beef AI bulls</th>
<th>Most used beef AI bulls</th>
<th>Difference</th>
<th>Value to finisher</th>
<th>Overall value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcass weight (kg)</td>
<td>330</td>
<td>313</td>
<td>17 kg heavier carcass</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Carcass conformation</td>
<td>R-</td>
<td>O+</td>
<td>1 conformation grade better</td>
<td>QPS grid payment &amp; base of €3.82, &amp; incl. QA</td>
<td>-</td>
</tr>
<tr>
<td>Carcass fat</td>
<td>4-</td>
<td>4-</td>
<td>No difference in carcass fat</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

- Difference from DBI expectation most likely from feed intake, out of spec etc.
DBI breakdown: beef active AI bulls

€ value

Dairy Beef Index  Value of Calving  Value of Beef

All breeds (641)  AA (79)  BB (131)  CH (110)  HE (47)  LM (102)  SI (61)
New calving evaluations

1. Additional traits considered (birth weight and birth size)
2. Stricter editing criteria uses only the most informative data
3. Updated economic values
4. Output = % progeny expected to require considerable assistance when born to 1) dairy heifers, and separately 2) dairy cows
### Relationship among cd% traits

<table>
<thead>
<tr>
<th></th>
<th>Dairy heifer cd%</th>
<th>Dairy cow cd%</th>
<th>Beef heifer cd%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy cow cd%</td>
<td>83%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef heifer cd%</td>
<td>64%</td>
<td>61%</td>
<td></td>
</tr>
<tr>
<td>Beef cow cd%</td>
<td><strong>38%</strong></td>
<td><strong>35%</strong></td>
<td><strong>88%</strong></td>
</tr>
</tbody>
</table>

- 62-65% of the variability of calving difficulty in dairy dams is not captured from calving difficulty scores recorded solely from beef cows.
Updated Economic Values

Non-Linear:
- Every 1% unit increase has same € value change up to a point
- Harder calving bulls penalised more

Calving difficulty (%) vs. Economic value applied (€)
Calving Difficulty of Active Beef AI Bulls

Reliability %

Calving difficulty %

- ALL
- AA
- BB
- CH
- HE
- LM
- SI

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Calving Difficulty Change Across Breeds

Active Beef AI Bulls

<table>
<thead>
<tr>
<th>Breed</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>79</td>
</tr>
<tr>
<td>BB</td>
<td>131</td>
</tr>
<tr>
<td>CH</td>
<td>110</td>
</tr>
<tr>
<td>HE</td>
<td>47</td>
</tr>
<tr>
<td>LM</td>
<td>102</td>
</tr>
<tr>
<td>SI</td>
<td>61</td>
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</table>
Mean (Sub-) Index € value at a given cd% in dairy heifers

- Easier calving bulls with average value beef have the highest DBI
- Harder calving bulls with highest value beef have the lowest DBI
Using the Dairy Beef Index

- For 2019, only beef AI bulls with ≥30 progeny in dairy herds
- Advice:
  - Pick beef bulls from the Active Bull List
  - Select a team of bulls
  - Select bulls with the highest Dairy Beef Index € value to maximise overall profitability
  - Also, ok to select bulls with the highest value of calving sub-index

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