Evaluation of production efficiencies among primiparous suckler cows of diverse genotype at pasture

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Background

- Beef suckler cows comprise half (1.1 m) of the national cow population (CSO, 2016)
- Two different replacement strategies
  - Heifers sourced from the suckler herd
  - Beef crossbred heifers sourced from the dairy herd
- New economic breeding indexes aid in selection process for more profitable suckler cows
  - Terminal Index
  - Replacement Index
### Replacement Index

Identification of animals suitable for breeding or selecting replacements

- Based on a cow’s performance per calving

<table>
<thead>
<tr>
<th>Trait</th>
<th>Relative Weighting (%)</th>
</tr>
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<tbody>
<tr>
<td>Calving traits</td>
<td>16</td>
</tr>
<tr>
<td>Feed intake</td>
<td>18</td>
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<td>Beef traits</td>
<td>21</td>
</tr>
<tr>
<td>Maternal milk</td>
<td>16</td>
</tr>
<tr>
<td>Female fertility</td>
<td>23</td>
</tr>
<tr>
<td>Docility</td>
<td>4</td>
</tr>
</tbody>
</table>

### Terminal Index

Identification of animals suitable to breed cattle for slaughter, or sale as weanlings/store cattle.

- Based on the progeny’s performance

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<tr>
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</thead>
<tbody>
<tr>
<td>Calving traits</td>
<td>25</td>
</tr>
<tr>
<td>Beef traits</td>
<td>72</td>
</tr>
<tr>
<td>Docility</td>
<td>3</td>
</tr>
</tbody>
</table>
National Genetic Trends

Profit/progeny (€)

Terminal Index

Replacement Index

ICBF, 2014
Replacement Index

Identification of animals suitable for breeding or selecting replacements

- Based on a cow's performance per calving

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Drivers of Profitability

Replacement Index Objective:
Facilitate genetic selection that has the potential to increase long-term suckler cow productivity

- 365-day calving interval  
  Current: 407 days

- 1 calf/cow/year  
  Current: 0.82 calves

- Age at first calving: 24 months  
  Current: 18%

- Milk yield/Calf performance

Feed efficiency

The Irish Agriculture and Food Development Authority
Experimental Overview

Maternal Herd established 2013

Two diverse genotypes
A. high genetic merit animals
B. low genetic merit animals

Replacement strategy
1. cows sourced from the suckler herd
2. beef crossbred cows sourced from the dairy herd
Divergence in Index

Heifers sourced were sired by AA and LM bulls only

- High Replacement Index (€119)
- Low Replacement Index (€50)

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow traits (€)</td>
<td>84</td>
<td>17</td>
</tr>
<tr>
<td>Progeny traits (€)</td>
<td>35</td>
<td>33</td>
</tr>
<tr>
<td>Replacement Index (€)</td>
<td>119</td>
<td>50</td>
</tr>
</tbody>
</table>
Objectives

Estimate production and energetic efficiencies among primiparous suckler cows of diverse genotype during mid lactation at pasture.
Materials and Methods

- 84 primiparous cows + progeny
  - 52 high index & 32 low index cows
  - 40 beef & 44 dairy crossbred cows

- Grazing Management
  - Rotational grazing system
    - Pre & post-grazing height 11.4 (s.d. 1.56) and 4.4 (s.d. 0.74) cm
  - Mean calving date 21st March
  - Cows were turned out to grass early April
  - Breeding commenced 29th April using terminal AA and LM sires
    - 13 weeks: 6 weeks AI, 7 weeks stock bulls
  - Gradual weaning from 20th – 27th October
  - Cows were housed on 3rd November – ad libitum grass silage
Animal Measurements

- Live weight (cow and calf)
- Cow BCS (0-5)
- Milk yield: weigh-suckle-weigh \( (\text{McGee et al., 2005}) \)
  - 120 and 156 days in milk
- Grass Dry Matter Intake (GDMI)
  - n-alkane technique: twice daily bolus for 12 consecutive days – 6 days intake data \( (\text{Dillon, 1993}) \)
  - 126 and 162 days in milk
Statistical Analysis

- Analysis carried out at the cow level
- PROC HPMIXED
- Fixed effects:
  - Cow
    - Genetic merit of the cow
    - Heterosis coefficient
    - Recombination loss
- Sire of the cow was a random effect
Results

The Irish Agriculture and Food Development Authority
Milk Yield (kg/d)

- High: 7.8 kg
- Low: 6.7 kg

1.1 kg (P<0.001)
DRY MATTER INTAKE & FEED EFFICIENCY
## Cow Production Efficiency

<table>
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</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Live weight (kg)</td>
<td>555</td>
</tr>
<tr>
<td>GDMI (kg/d)</td>
<td>11.8</td>
</tr>
<tr>
<td>GDMI/100kg BW (kg)</td>
<td>2.20</td>
</tr>
<tr>
<td>Milk Yield/100kg BW (kg)</td>
<td>1.26</td>
</tr>
<tr>
<td>Milk Yield/GDMI (kg)</td>
<td>0.58</td>
</tr>
<tr>
<td>RFI (UFL)</td>
<td>-0.03</td>
</tr>
</tbody>
</table>

1 weighted standard error of the mean
Conclusion

- Results from year one:
  - High index cows produced an additional 1.1 kg/d milk compared to low index cows
  - High index cows had a lower BCS than low index cows
  - No significant differences were found on any other traits investigated
  - Cow LW, GDMI or production efficiency during mid-lactation
Thank you!