Practical Aspects of Implementing Genomic Selection in Ireland

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Herd Recording Managers Workshop
12-14 May 2009 – Porec, Croatia.
Practical Aspects

Organisations & people to:
• provide data needed for the research
• do the research
• implement the findings
Irish Cattle Breeding Federation Society Limited (ICBF)

• **Established with interim Board in 1997**
• **Commenced operations in 1998**
• **Current structure in 2000**

• **Mission: achieving the greatest possible genetic improvement in the national cattle herd - Dairy and Beef**

1. ICBF Rules as amended in 2003
1. Organisation and people focused on delivering genetic improvement.
2. Stakeholders in cattle breeding control decision making.
3. Phenotypes needed to research genomic selection.
Research

- TEAGASC
  - State research body
  - Committed to genetic research
  - Committed to developing scientists
  - Collaborates closely with ICBF
  - Collaborates with international leaders
  - Funding for genotyping of 1,200 bulls

4. Research partner with skills, funds, & motivation.
Research – Genomic Selection

- DNA from 1,200 HF bulls with Irish progeny tests results
- Genotyped with 54K SNP Chip
- Results correlated with progeny test results
- Gave 15% increase in reliability (over ancestry only information)

5. Research established the benefit of genomic selection.
A scatter plot shows the relationship between Genomic EBI and Progeny Test EBI. The data points are scattered across the graph, indicating a correlation between the two variables. The x-axis represents Progeny Test EBI, ranging from -150 to 200, while the y-axis represents Genomic EBI, ranging from -200 to 300.
Research – Breeding Scheme Implications

- What is the impact of genetic evaluations on young bulls being 15% more reliable than ancestry only information?
- ICBF commissioned research – Theo Meuwissen – breeding scheme implications.

6. Contracted a researcher to find the answer to breeding scheme implications question.
Research Results – Optimal Design for Ireland

- Genotype 500 young bulls/year.
- Progeny test best 100 of these with 100 milk recorded daughters.
- Use best bulls (proven & genomically selected) to breed dairy replacements.
- Extra genetic gain, increased inbreeding, & lower cost.
Research Results

- Genotype 500 young bulls/year.
- Progeny test best 100 of these with 100 milk recorded daughters.
- Use best bulls (proven & genomically selected) to breed dairy replacements.

Extra genetic gain, increased

7. Research identifies the optimal breeding scheme design for Ireland.
Key Decisions

- Progeny test – reduce incentives (cost saving).
- Use GS bulls for breeding herd replacements.
- Modify communications to farmers to accommodate GS.

8. Translate breeding scheme research into operational detail.
Key Messages to Farmer

• Genomics is a technology for increasing the rate of genetic improvement.
• The best of the GS bulls should be considered for breeding herd replacements.
• Use GS bulls in teams to reduce risk.
### ICBF Active Bull List

#### Daughter Proven in Ireland
- **OJI** (O-BEE MANFRED JUSTICE)
- **RXO** (RAMOS)
- **HTH** (HAZAEL LIGHT DETECTOR S2F)
- **OLG** (BALLIVOR OLYMPIC GOLD ET)
- **BYJ** (BALLYDEHOB JUSTICE)
- **HZL** (HILLSDALE LIONEL)
- **RXR** (MONAMORE ROMERO ET)
- **GIO** (GIBOR)

#### Genomically Selected
- **OLG** (BALLIVOR OLYMPIC GOLD ET)
- **BYJ** (BALLYDEHOB JUSTICE)
- **HZL** (HILLSDALE LIONEL)
- **RXR** (MONAMORE ROMERO ET)
- **GIO** (GIBOR)

#### Daughter Proven International
- **OLG** (BALLIVOR OLYMPIC GOLD ET)
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#### Conf. Interval
- > 35%
Communication with farmers

- National farming press – full page each week for 16 weeks covering breeding season.
- Letter and fact sheet to 12,000 dairy herds.
- Website – www.icbf.com
- Staff and Advisors

Breakdown of (64,000) recorded inseminations in March & April 2009 by bull proof type.

- DP-INT: 30%
- DP-IRL: 35%
- GS: 35%
10. Monitor Progress
Future Priorities

- Streamline genotyping
- Streamline genetic evaluation process
- Expand training population through collaboration – more bulls & breeds – key role for Interbull
- Research beef – 500K SNP chip, across breeds, seeking collaborators

11. Invest in future developments.
1. Organisation and people focused on delivering genetic improvement.

2. Stakeholders in cattle breeding control decision making.

3. Phenotypes needed to research genomic selection.

4. Research partner with skills, funds, & motivation.

5. Research established the benefit of genomic selection.

6. Contracted a researcher to find the answer to breeding scheme implications question.

7. Research identifies the optimal breeding scheme design for Ireland.

8. Translate breeding scheme research into operational detail.


10. Monitor Progress

11. Invest in future developments.
Acknowledgements