Unlocking Genetic Potential: The National Genotyping Programme

ICAR 2024, Bled, Session 9

Mark Waters ICBF

13th May 2024
Why Genotype the National Herd?

Ireland’s Total GHG Emissions

- Targeted Emissions Reduction
Why Genotype the National Herd?

Ireland’s Total GHG Emissions

- Agricultural Emissions

[VALUE]
Why Genotype the National Herd?

Ireland’s Agricultural GHG Emissions

Livestock Emissions
Why Genotype the National Herd?

Ireland’s Agricultural GHG Emissions

Breeding = Win Win!
The Effect of Genomics on Genetic Gain

Average EBI and Beef Euro-Star Indexes Over Time

- Dairy Genomics Introduced
- Beef Genomics Introduced
Rewards of Genotyping

400%!
Where Are We Starting From?
Level of Genotyping **Up to 2023**

>3 Million Genotypes Total

350-400K New Genotypes/Year from Government Schemes (BDGP and SCEP)
Level of Genotyping Up to 2023

Percentage of National Suckler Herd Genotyped 2023

Percentage of National Dairy Herd Genotyped 2023
How Do We Get to Fully Genotyped?
DNA Calf Registration System

Typical DNA Registration Timeline

- **Farm**
  - Calf born and tagged.
  - DNA Sample Posted
  - Calf Registration Submitted to Department of Agriculture

- **DNA Lab**
  - Genotype Parentage Results sent to Department of Agriculture.
  - Parentage and Sex Errors Corrected.

- **ICBF/DAFM**

- **Farm**
  - Animal Passport issued to Farmer.

- **Animal Passport**
DNA Calf Registration Pilots

- Number of Herds
- Number of Calves Registered

- 2018: 18, 1.537
- 2019: 35, 1.652
- 2020: 269, 21.141
- 2021: 401, 33.404
- 2022: 560, 40.201
- 2023: 594, 43.676
DNA Calf Registration Pilots

Data Integration and Transfer

Reduced Turnaround Times

“Double Tissue” Calf Tags
National Genotyping Programme (NGP)
National Genotyping Programme (NGP)

Launched June 2023
NGP Phase 1 - 2023

National Genotyping Programme

Apply today!
NGP Phase 1 - 2023
NGP Phase 1 - 2023

10,600 Herds Total

Total Herds in NGP

- Dairy: 6,800
- Beef: 3,800

AgTech – it’s in our DNA
NGP Phase 1 – 2023

NGP Phase 1 Genotypes Reported by Week

780,000 Samples Total!

Fully Funded by Department of Agriculture

An Roinn Talmhaíochta, Bla agus Mara
Department of Agriculture, Food and the Marine

AgTech – it’s in our DNA
Level of Genotyping After NGP Phase 1

>4 Million Genotypes Total

620K Genomic Evals Published at once – Jan 2024

Dairy Genomic Evaluation Report
Level of Genotyping After NGP Phase 1

Percentage of National Suckler Herd Genotyped 2023

Genotyped [VALUE]
Level of Genotyping After NGP Phase 1

Percentage of National Suckler Herd Genotyped After NGP Phase 1

[VALUE]

Genotyped
Level of Genotyping After NGP Phase 1

Percentage of National Dairy Herd Genotyped 2023

[VALUE]

Genotyped
Level of Genotyping **After NGP Phase 1**

Percentage of National Dairy Herd Genotyped After NGP Phase 1

[VALUE]

- Genotyped
Lab Infrastructure

WEATHERBYS SCIENTIFIC

+ eurofins

Thermo Fisher SCIENTIFIC

Axiom Propel Express
384HT Workflow

+ ICBF Custom, IDB version 5
SNP Chip
NGP Phase 2 – 2024 - 2027
NGP Phase 2 (2024 – 2027)
NGP Phase 2 (2024 – 2027)

Contribution to Calf Genotypes

- €6

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Bha agus Mara
Department of Agriculture,
Food and the Marine

AgTech – it’s in our DNA
NGP Phase 2 (2024 – 2027)

563,000 Genotyped and Registered by end of April

35% of all calves!
NGP Phase 2 (2024 – 2027)

Calf Sample Processing Forecast vs Actual 2024 (per week)

>98K Calves in a Single Week!
NGP Phase 2 (2024 – 2027)

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Department of Agriculture, Food and the Marine
NGP Phase 2 (2024 – 2027)

- 15.08% Parentage Errors Prevented (Dairy)
- 10.67% Parentage Errors Prevented (Beef)
- 1.50% Sex Errors Prevented (All)
- 3.20% Correction of Recorded Breed
- 8.23% Calves Submitted with No Sire

Where No Sire Recorded by Farmer

Example of ~18k breed errors corrected:
- 3,890 registered as AA but not AA
- 3,992 AA registered as another breed
PREPARE TO BE AMAZED
NGP Phase 2 (2024 – 2027)

*Typical DNA Registration Timeline*

**Average Birth to Passport issued = 13 days**

Each Calf received Genomic Evaluation within 2 weeks of Registration
NGP Phase 2 (2024 – 2027)
AgTech – it’s in our DNA
Where to Next?

Any Questions?
Our Farmer & Government Representation

Our AI & Milk Recording Organisations

Our Herdbooks

Acknowledging Our Members