

Abstract Submission Form

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Preferred presentation

Oral

Preferred session

Session 9: WG DNA – Genomic's impact on Livestock Sustainability

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Title of your paper

Unlocking Genetic Potential: The National Genotyping Programme for Ireland's Cattle Herd

Insert ABSTRACT text

Genetic gain, particularly in the context of lowering Ireland's agricultural Green House Gas (GHG) emissions, is a key strategic goal of both industry and government as set out in the Department of Agriculture, Food and the Marine (DAFM) "Ag Climatise" strategic policy document of 2020.

Genotyping the entire national bovine herd will underpin and accelerate the rate of genetic gain by leveraging genomic information and technologies against the existing integrated national database in ICBF to increase the accuracy of Ireland's national breeding indexes (EBI, Beef-Eurostar, DBI) and provide further tools to improve the national breeding programme.

The National Genotyping Programme (NGP), a collaborative initiative, between ICBF, DAFM, beef and dairy industry stakeholders and participating farmers, is the first step in achieving a fully genotyped national bovine herd in Ireland.

The advancement in the scale and accuracy of genomic selection, alongside numerous auxiliary benefits, such as enhanced traceability of beef and dairy products, labour saving and reduced administration, prevention of cattle theft etc, provided by NGP, offers Irish agriculture with a profound opportunity which is estimated to provide up to €80 million (4:1) of a return on investment (Abacus bio, 2022).

The NGP operates under a co-funded model, sharing the cost across E.U., DAFM, Dairy Industry Ireland (D.I.I.), Meat Industry Ireland (M.I.I.) and direct farmer contributions. Over 10,000 herds applied to participate, including ~3,500 dairy herds and ~6,500 beef herds, accounting for over 650,000 cows in total.

Building on over 3.5 million genotypes already in the ICBF database, collected directly by farmers and through previous genotyping initiatives, the first phase of NGP saw over 780,000 animals genotyped in 2023, including each participant's mature cow herd, breeding heifer replacements and expected calf sires. This was achieved, at no cost to the farmer, using E.U. funding under the Brexit Adjustment Reserve. The second phase, which began in January 2024, has seen participating herds submit genotype samples at birth for all calves born in the herd, which will continue for the remainder of the programme (2024 to 2027 incl.). The results of each genotype sample are integrated into the national calf registration system through the DNA calf registration process and are used to correct any errors in the recorded dam, sire and/or sex of each calf prior to its bovine passport being issued. The cost of genotyping each calf in the programme is shared equally 3 ways between the farmer, DAFM and Industry with each contributing approximately €6/calf.

The DNA calf registration process offers many technical and logistical challenges. The operational aspects of the programme are multifaceted, involving the collection, processing, and analysis of genetic data, integration of software and data between the ICBF database, the national traceability database in DAFM and dedicated Farm Software Providers and the development of new national identification tags which allow for both a genotype sample and the mandatory Bovine Viral Diarrhoea sample to be taken without the need for any additional tissue tags.

The DNA calf registration process now in operation as part of NGP, has been tested and refined through multiple pilot programmes, starting in 2018 with just 18 herds. Continued process improvements, along with meticulous planning and coordination among the various stakeholders, has allowed the process to admirably handle a more than tenfold increase to 650,000 registrations in the year of the programme which equates to approximately a third of all calves born in Ireland each year. This is being achieved with an average lab turnaround of 4.5 days, calves fully registered by an average of 12 days old, and with over 98,000 samples processed in a single week during the spring peak.

Enter keywords

Genotyping, Genomics, Cattle, Calf Registration, Ireland