Focus Areas - Section 4

Animal Genetics

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Northern Ireland Farm Animal Biobank (N.I.FAB)

Dr Masoud Shirali

Supporting the Sustainability of Livestock Farming in Northern Ireland

Key Messages

N.I.FAB is a DAERA funded project which has been collecting detailed data over the past three years, representing important characteristics which drive productivity and the environmental impact of cattle and sheep on the AFBI and CAFRE herds. This extensive dataset now stretches to 10 billion rows of records.

N.I.FAB provides an essential data resource to develop tailored breeding indexes and tools for Northern Ireland.

The use of this data within N.I.FAB will enable solutions to be developed which will help Northern Ireland farmers increased productivity, reduce their environmental impact, and enhance the health and welfare of their animals.

Background

The Northern Ireland Farm Animal Biobank (N.I.FAB) is a project dedicated to enhancing the sustainability of farming. Funded by the Department of Agriculture, Environment, and Rural Affairs (DAERA), N.I.FAB was launched in April 2022. Its mission is to lay the groundwork for using animal data and advanced data technologies, such as artificial intelligence (AI) and machine learning (ML), to improve livestock farming.

N.I.FAB serves as a centralized database of animal records, management and nutritional data, environmental measurements, and various biological data from the AFBI and CAFRE herds and flocks.

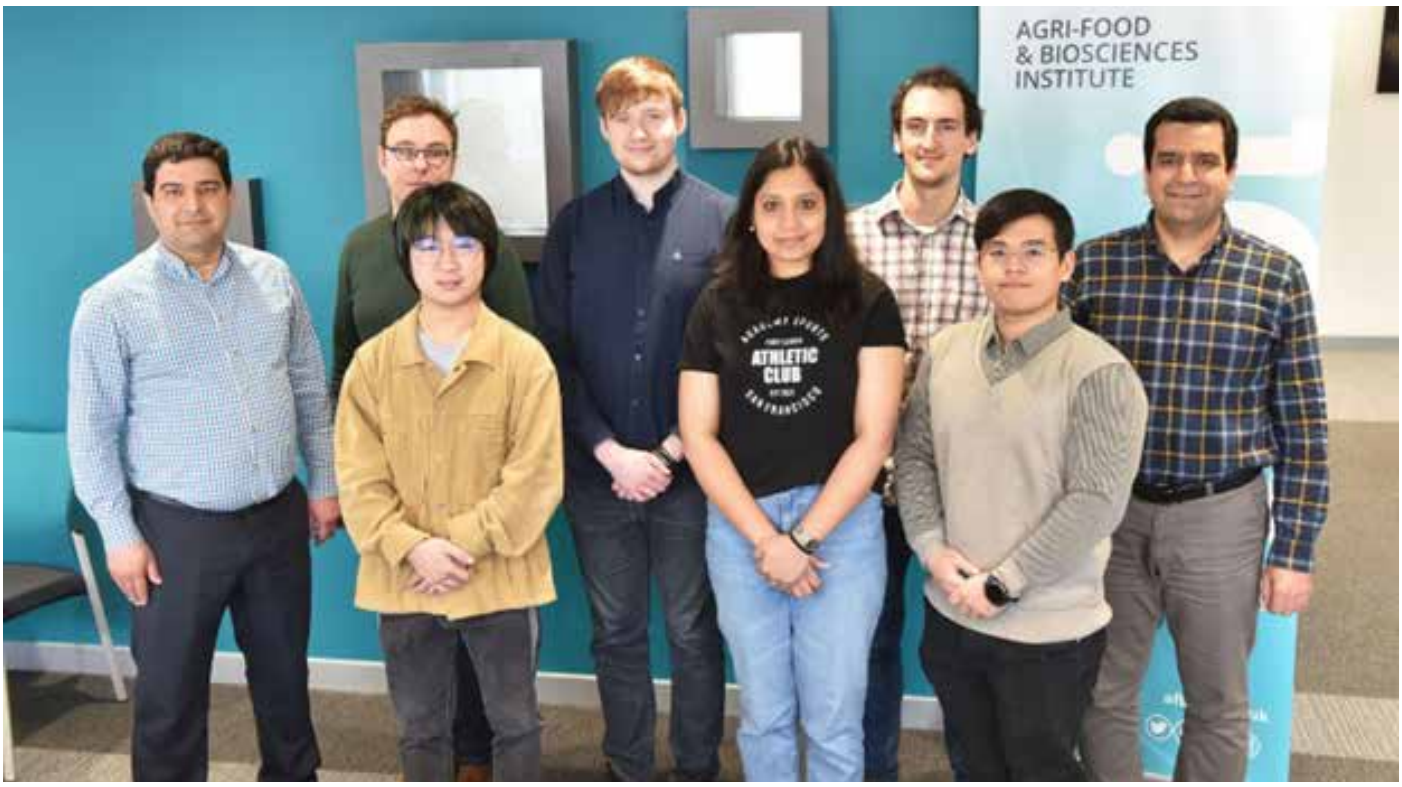
N.I.FAB is led by Dr. Masoud Shirali, a specialist in genetics and animal breeding. Dr Shirali believes the future of animal breeding lies in comprehensively understanding how animals' genes affect their traits and the mechanisms that control this process ("genome to phenome"). Dr. Shirali and his colleagues, including eight Ph.D. students, are collaborating with well-known researchers from the UK and beyond. They're using AI and ML on N.I.FAB data to develop genetic and data science approaches to enhance livestock farming in Northern Ireland and beyond.

N.I.FAB's Focus Areas

N.I.FAB's key strategic areas of focus to enhance the sustainability of livestock farming are:

1. Reducing Livestock's Environmental Footprint:

N.I.FAB and its associated projects are developing strategies and technologies to reduce emissions such methane and ammonia, resulting from livestock farming.



Dr Shirali's team from left to right: Dr Masoud Shirali, Sarunas Dzinkevicius, Wentao Jiang, Richard Hills, Steffimol Rose Chacko Kaitholil, Stephen Ross, Edwin Ong Jun Kiat, Dr Vahid Razban.

The N.I.FAB team are exploring ways to predict emissions at the individual animal level through understanding genetic variation and how an animal's DNA interacts with the farm environment and livestock management. Such knowledge will help inform the development of breeding and management tools to decrease these emissions.

2. Improving Animal Health and Welfare:

Using N.I.FAB, the AFBI researchers are implementing innovative methods on utilizing data sciences on biological data to improve the health and welfare of farm animals. The AFBI researchers focused on addressing common health issues such as udder infections (mastitis), lameness, bovine tuberculosis (TB). One of the strategies involves selecting the best animals for breeding based on a wide range of health data. This approach contributes to healthier animals that live longer and are more productive and profitable.

3. Making Farming More Profitable and Sustainable:

These goals will be achieved by improving the understanding of the biological factors that make an animal more profitable to a farmer as well as what makes the animal more environmentally friendly. This knowledge will be used to develop breeding indexes and strategies to guide farmers in selecting the best animals for breeding based on profitability and environmental friendliness.

How N.I.FAB is Making a Difference

As of March 2024, the N.I.FAB database boasts data for around 48,000 animals and over 10 billion rows of records, enriched with results of high throughput biological analysis. N.I.FAB is providing the essential data and foundation needed to enable scientists to develop breeding and management tools that enable farmers to make more informed decisions. This science discovery and innovation platform will develop new insights that will feed through into farmer facing breeding and management information helping advance productivity whilst reducing environmental impacts and enhancing animal health and welfare.

Further information about the N.I.FAB is available at www.afbini.gov.uk/articles/nifab

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