# Global Methane Genetics initiative
# Beef Working Group

November 6, 2025

# Welcome!

- Aim

  - Update what's happening in Global Methane Genetics

  - Network building

  - Share: knowledge & hurdles

  - Discussion: gaps & needs

# Agenda

- Update from GMG  (Birgit)

- Data sharing & data base development (Roel)

- Update ICAR Feed&Gas wikipage (Chantal)

- Update sniffer SOP/testing center for methane recording devices (Yvette)

- Update from the GMG Beef (Blue grass and US beef) – (project leaders)

- Update Projects outside GMG (all)

- Open discussion about research gaps (all)

- AOB

# **G**lobal **M**ethane **G**enetics initiative

**Investment of 27M US$**
**25 countries, 50 partners, 25 breeds**
**Methane pheno- & genotypes ~110k cattle & sheep, ~20k microbiome**

**Dairy:**
Holstein (~42k)
Jersey (~8k)
(Nordic) Red Breeds
(~7.3k)
Brown Swiss (~3.3k)

Develop protocols
Phenotyping
World-wide sharing
Genetic evaluation

**Africa**
Local breeds & crosses (~4k)

**Latin America**
Beef (~7k)

**Beef:**
North America (~6k)
Australia, Ireland,
UK, NZ, North America
(~18.5k)

**Sheep: world-wide**
**reference population**
Australia & New Zealand
UK & Ireland
Uruguay (~17k)

**Microbiome:**
World-wide reference
population
(~20k samples)

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BEZOS
EARTH
FUND

Global
Methane
Hub

4

# Update GMG

- Startup meeting Innsbruck

- Second newsletter [1].


- Contracts

- Proposal development: small holder farms, Asia & buffalos

- Framework of adoption & incentivization system for genetic selection as methane mitigation tool

[1] Sign up: https://www.wur.nl/en/project/global-methane-genetics-initiative.htm

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# GMG data sharing & data base

- Two data sharing agreements: 1) GMG paid data and 2) exchange for record contribution.  Will be sent for signature to partners

- Database

  - Business requirement and review existing database

  - June three offers to build August contracted, weekly meetings, tomorrow consultation meeting

  → planned delivery February

# Architecture & Data Flow

➡ **User upload Via SharePoint: 1 → 2**

➡ **User upload Via Web: 7 → 8**

➡ **Data processing: 3 → 4 → 5 → 6 → 9**

**Landing DB**
- ✓ Storing a copy of imported files
- ✓ Validate & cleanse data

**Data Warehouse**
- ✓ Centralized methane data store
- ✓ Keeping historical version of data records
- ✓ MiXBLUP integration
- ✓ Contribution score

**Data Mart (Contribution Score)**
- ✓ Dedicated database for data extraction

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## Methane Global Hub Architecture
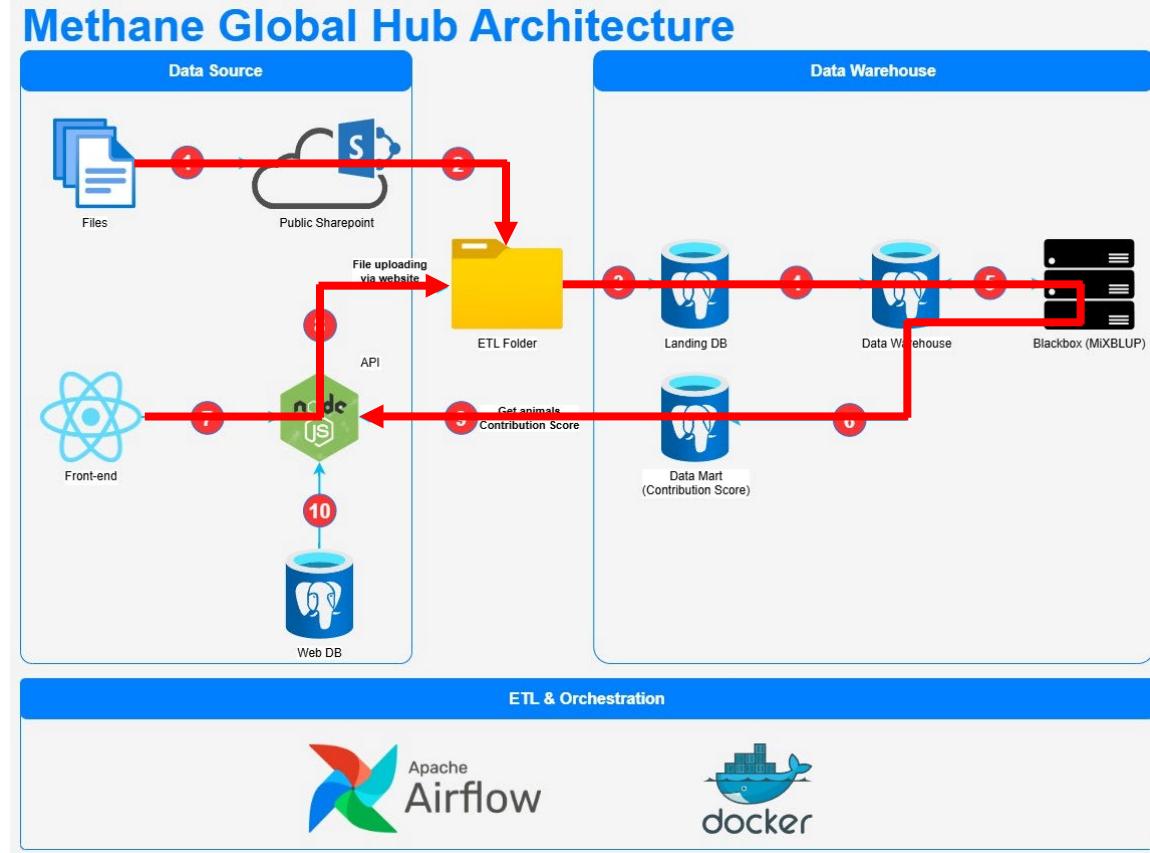
# ICAR Feed&Gas wikipage

- https://wiki.icar.org/index.php/Section_20_%E2%80%93_Methane_Emission_for_Genetic_Evaluation

- GreenFeed

- Wearables

- Microbiome protocols coming soon

- Activities: https://wiki.icar.org/index.php/Section_20:_Activities

- Activities – send us information about projects & events to be included here!

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# Develop protocols for methane recordings

- Establishing quality standards for **sniffers** and setting up test facility (lab and on farm) for different sniffer types that will serve as guidelines when starting to collect methane records

  - Compare specifications of commercially available sniffers

  - Calibrate and validate a few of these in our Air Quality Lab

  - Set up a test facility on farm with different sniffer types

  - Validate these sniffers against the lung method[*] and a GreenFeed

  - Set up protocol for methane recordings with a sniffer device

# Specifications on ICAR Wiki

ICAR Wiki: https://wiki.icar.org/index.php/Guidelines

# Set up lab facility

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# Set up on farm facility

# Set up lung method (= Gold Standard)

https://edepot.wur.nl/536449
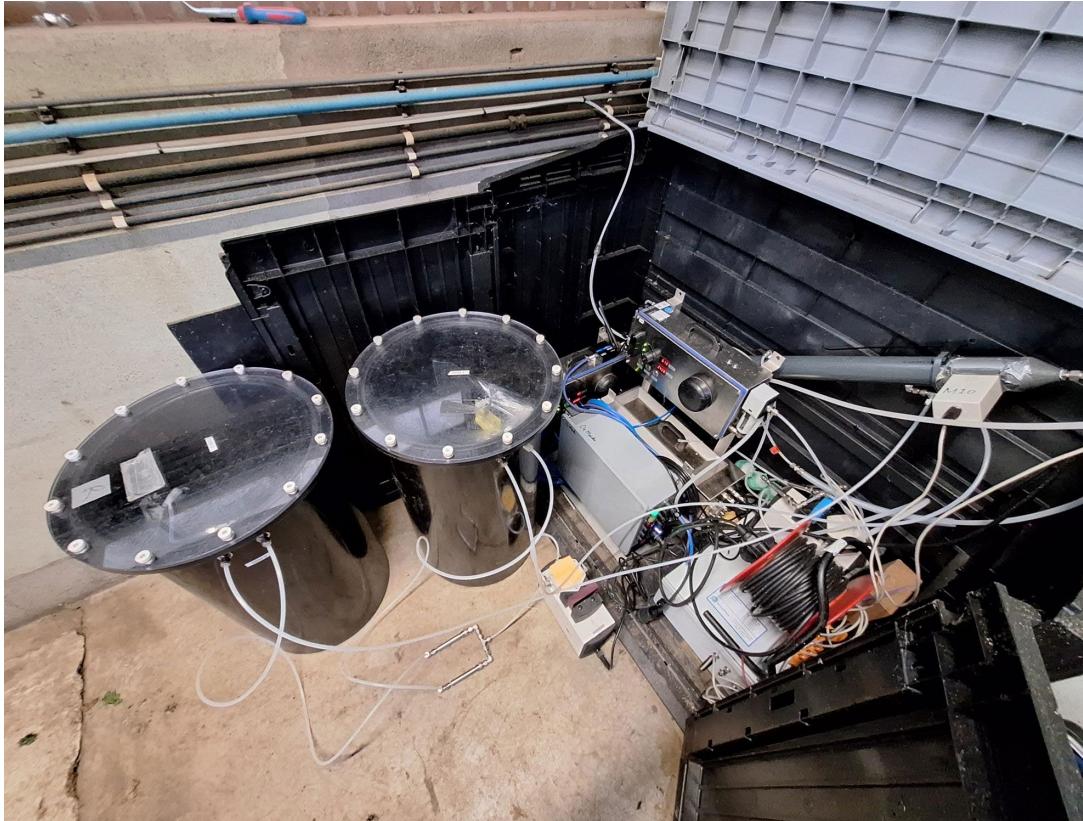
# ICAR test facility

- First for sniffers

- Later maybe also for other methane devices?

- ICAR Board meeting earlier this week



## ICAR Validated Sensor Systems

Beyond official milk recording, obtained with ICAR certified devices, results from devices also supports farm management by providing insights into production, animal health, welfare, and sustainability, often enhanced by mathematical models and algorithms. Given the diversity of applications, a single evaluation protocol is impractical; instead, ICAR offers claim validation for solutions outside official milk recording to ensure user trust while allowing flexibility in development.

ICAR validation ensures that a  device (e.g. milk meters for cows and sheep/goats, automatic milking system (AMS) device, milk analysis device, on farm at/in line milk analyzer, sensor device)  meets manufacture performance claims through ICAR-approved test plans conducted by a qualified ICAR Test Center.

Successful validation confirms that the system can reliably deliver quality data when used correctly, leading to the award of an **ICAR Certificate of Validation**.

### Apply now

Submit the application form to request a validation now.

[ Application form ]

The application form should be accompanied by the requested documentation:

- Clear description of all components of system – ID, components, software, etc.
- System technical manual
- Farm operator manual
- Internal research and validation studies
- Peer reviewed publications
- Software manual for use of the system devices
- Installation procedure
- Routine test or periodic checking procedures for service technicians
- Technical characteristics, drawings and 2D/3D pictures of the device

### Validation procedure

1. The applicant submits an application form
2. The application is reviewed, and the Test Centre is designated.
3. The Test Centre prepares the test plan, detailing the timeline and associated costs.
4. ICAR provides the applicant with an umbrella contract and invoice for test fees, along with the test plan.
5. Testing begins upon signing of the contract by the applicant and full payment of the test fees.
6. Upon test completion, ICAR disseminates the report to the MRSD Sub-Committee for review, comments, and recommendations.
7. ICAR forwards the report to the applicant and issues the official ICAR Certificate upon successful completion of the test.
8. The certified device/system is listed on the ICAR website.

# Update GMG Dairy projects

- Bluegrass (Steve Miller)

- US Beef (Matthew Spangler)

# BLUEGRASS

Global Methane Genetics initiative
Led by WAGENINGEN UNIVERSITY & RESEARCH
In Partnership with BEZOS EARTH FUND, Global Methane Hub

Department of Primary Industries and Regional Development
NSW GOVERNMENT

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

University of New England

Low Methane Beef PROJECT

Reducing emissions from Northern Beef
**Australia**
Ben Hayes

**Australia**
Sam Clark
Tom Granleese

mla DONOR COMPANY
MEAT & LIVESTOCK AUSTRALIA
**Australia**
National Livestock Genetics Consortium

agbu 50 years
powering genetic improvement
**Australia**
Steve Miller
Michael Aldridge

zneag CRC
**Australia**
Ben Hayes
Sam Clark

AGI
**North America**
Kelli Retallick
Andre Garcia
Pedro Ramos
Troy Rowan (UT)

BLUEGRASS Alliance

beef+lamb new zealand
agresearch
āta mātai, mātai whetū
**New Zealand**
Jason Archer
Susanne Rowe

Leveraged through

ANGUS Foundation

Teagasc
AGRICULTURE AND FOOD DEVELOPMENT AUTHORITY
icbf
AgTech-It's in our DNA
**Ireland**
Donagh Berry
Ross Evans

AHDB
SRUC
**United Kingdom**
Mike Coffey
Kim Matthews
Harriet Bunning

Note BLUEGRASS is a sister project to Cleanbreeding (sheep)

agbu 50 years
powering genetic improvement

🇦🇺 7,000

🇺🇸 7,000

800

2100

1625
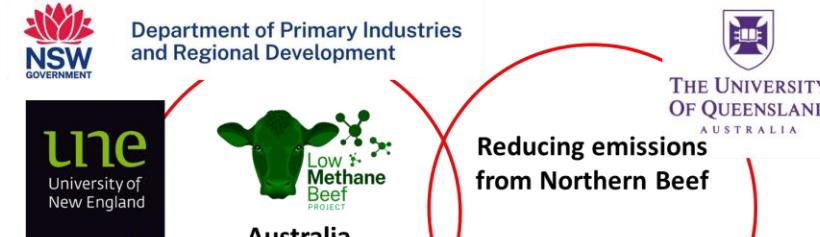
Combining datasets across Australia would yield ~32,000 animals with CH4 recorded
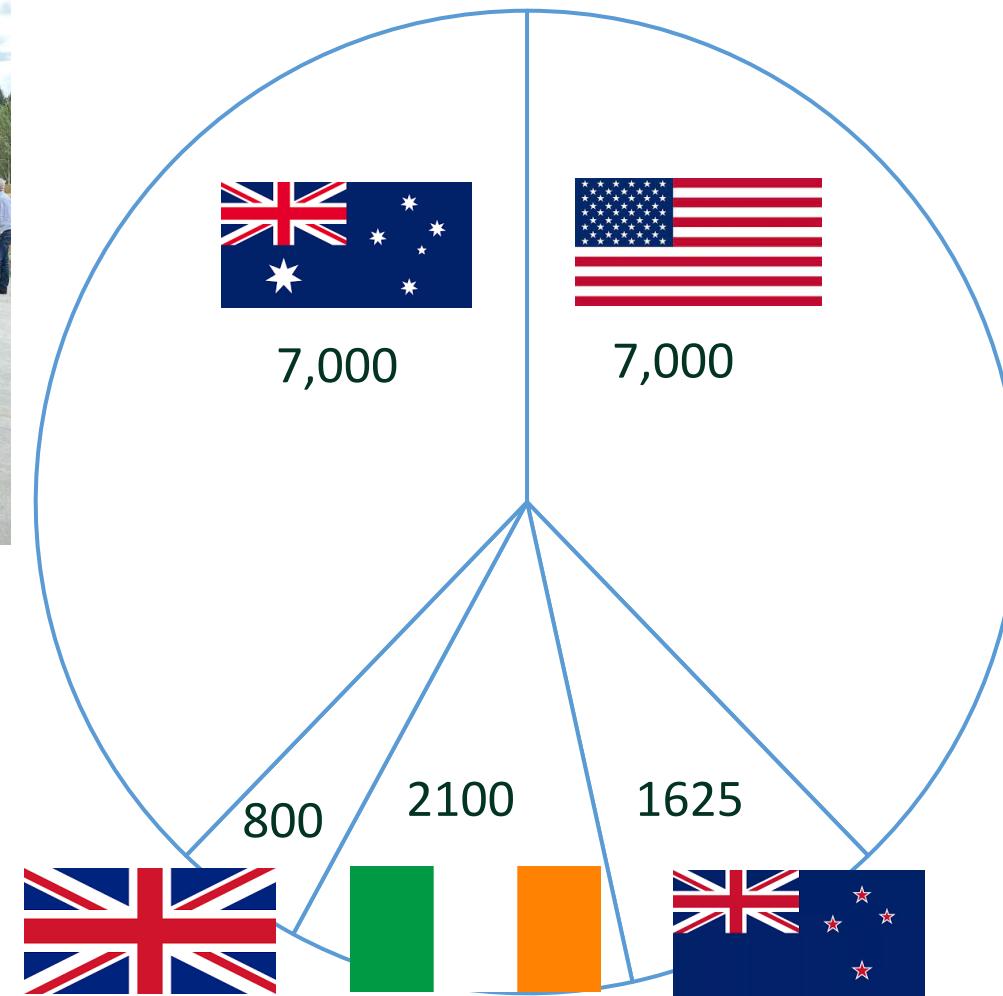
*12,000 funded by GMG

# Target Classes of Animals and Breeds

- Decision to do fewer breeds well.

- Primarily Angus and Hereford

- Target is Mature Grazing Cow

- Growing animals with link to Feed intake

# Monthly Scientific Committee Meetings

**76th EAAP Annual Meeting 2025**
Innsbruck, Austria - 25/29 August 2025

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agbu
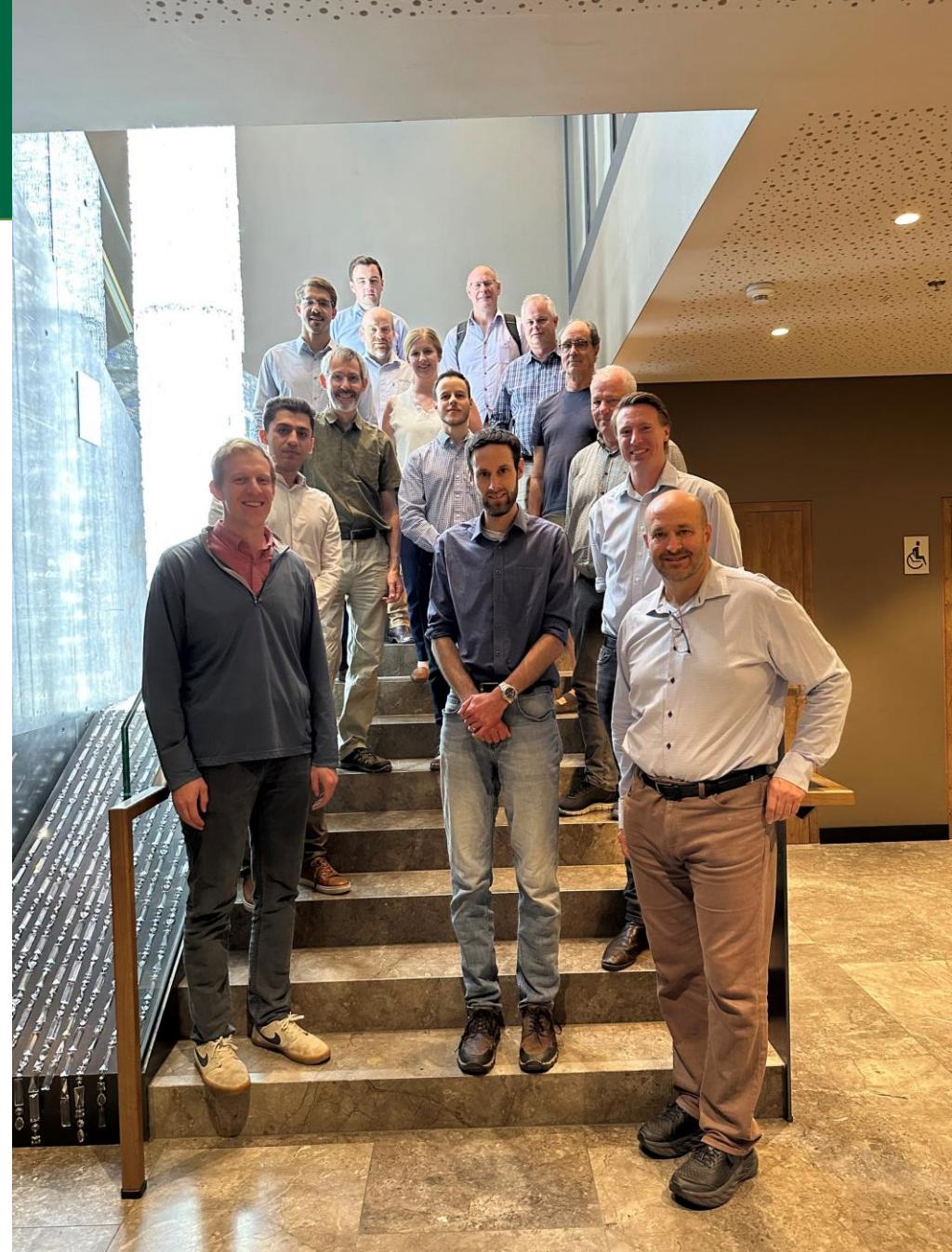
# U.S. BEEF PROJECT UPDATE

Global Methane Genetics Working Group Update

Matt Spangler

University of Nebraska-Lincoln

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# GMG PROJECT DESIGN

## Gas phenotyping



PC: Washington State University

**5,500 gas output phenotypes**
from cattle (grazing cows, developing heifers, steers) representing 18 highly utilized beef breeds
2 GreenFeed units currently
Additional platforms planned for purchase

## Microbiome sampling
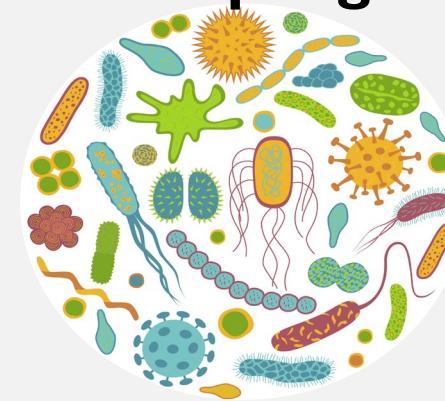


metagenomic samples **for sequencing = 1,100**

*Rumen metagenomic sequence, n = 2,300*

## Continue feed efficiency trials



PC: Kansas State University

Collect **3,500 feed intake records** from GPE steers and heifers, diff. rations

*Feed efficiency records from n = 10,500 GPE cattle*

# EARLY INSIGHTS

- Language matters
  - "energetic efficiency"
  - Perhaps best chance we have at predicting feed intake of grazing animals

# What's happening in Beef – other projects/initiatives

- A quick round for input

# What else should we do to accelerate progress? i.e. research gaps

- Trait definition – ratio trait? Which trait in the breeding goal? Challenge inclusion methane in breeding goals

- GxE feed additives

- Beef on dairy

- Genetic correlation between methane & feed intake/efficiency

- Measuring methane in young (heifer) animals

- Software QC, data editing

# Thanks for your attention & contributions!

gmg@wur.nl

Newsletter:

https://www.wur.nl/en/project/global-methane-genetics-initiative.htm?wmstepid=thank_you