Accelerate genetic progress to reduce methane emission – **Sheep working group**

Chairs: Yvette de Haas & Michale Aldridge, ?. May 20, 2025

Aim working groups

- Introduce Global Methane Genetics & running projects

- Bring people together and build network

- Share knowledge, experience, hurdles & issues

- Collaborate on key topics

  - E.g. Smaller groups, task force

- 2 meetings a year

Agenda

- Welcome & Aim

- Global Methane Genetics initiative (Roel)

- ICAR Feed&Gas guidelines & wiki (Birgit)

- GMG Sheep projects (Daniel)

- Any other Sheep project?

- Discussion:

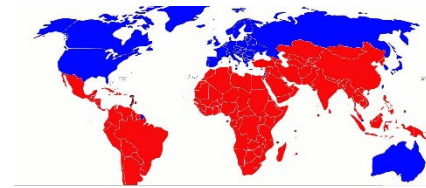 - Gaps & Needs, ideas, opportunities

- AOB

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GMG: Why? How? What?

- Genetic progress can make a **permanent** and **impressive contribution** to reducing methane output from livestock systems **globally**

- We aim to accelerate genetic progress and to implement breeding strategies for reduced methane emissions in ruminants in the **global North and South** by supporting

  - **sharing of protocols** and **data**,

  - **expanding phenotyping**, breeding program design

  - **genetic evaluations**

  - development of **Global Livestock Genetics and Genomics Programs**

Global Methane Genetics initiative (GMG)
Accelerate genetic progress for low CH_4 emitting ruminants

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)

World-wide sharing
Develop protocols
Phenotyping for
reference populations
Genetic evaluation
Impact of genetics

Africa
Dairy & crossbreeds (~1.5k)

South America
Beef & indigenous (~7k)

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

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

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

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BEZOS
EARTH
FUND

Global
Methane
Hub

Global Methane Genetics (GMG) initiative

Key areas – current activities

- Projects get started

- Share data – data base for external and GMG internal data sharing

- Fair share principle

- SOP for recording & harmonisation of data pipelines across partners

- Build facility to test methane recordings of many individual cows

- Group Objectives
  - Update, promote and extend guidelines for phenotype recording – methane and feed intake in ruminants
  - Guidelines for full range of traits in sheep and goats
  - Harmonisation & standardisation
  - Conduct surveys, reports for recording schemes
  - Provide a forum and foster knowledge exchange
  - Facilitate and coordinate international collaboration

https://https://www.icar.org/group/working-group-sheep-goats-and-camelids/

https://www.icar.org/group/working-group-feed-and-gas/

BWYPEP: Michael Aldridge

- **ICAR Wiki**: https://wiki.icar.org/index.php/Guidelines
- Section 20: Methane emissions for genetic evaluations

ICAR WIKI

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Section 20 – Methane Emission for Genetic Evaluation

📄 Page   💬 Discussion   📖 View source   🕐 History

This is the approved revision of this page; it is not the most recent. View the most recent revision.

NOTE: This version of Section 20 has been approved by the working group's Chair. Please be aware that further revisions may occur before final review and approval by the Board and ICAR members per the Approval of Page Process.

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- ICAR Wiki: https://wiki.icar.org/index.php/Guidelines
- Section 20: Methane emissions for genetic evaluations

4 Sub-sections

Definition and Terminology

Methane determining factors

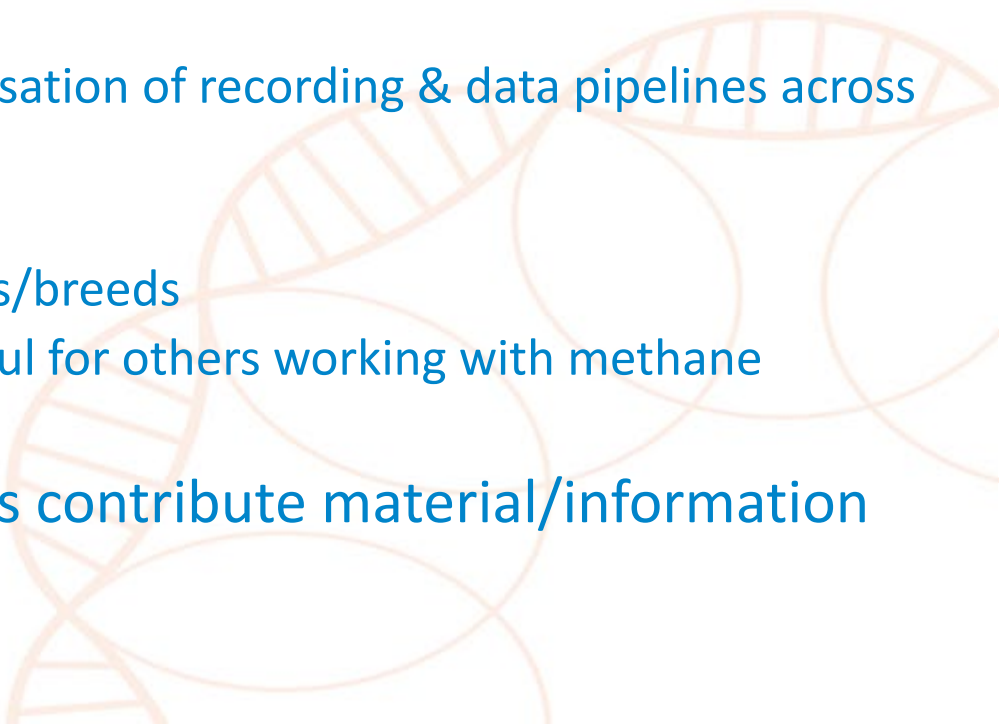Methane measurements methods

Sniffer SOP
GreenFeed SOP
PAC

Proxies

Proxies discussion

Merging and sharing data in genetic evaluations

Ongoing activities

Projects
Initiatives
Course material

…

- GMG projects/partners valuable source of existing & newly developed information

  - Recording devices
  - Protocols & SOPs – harmonisation of recording & data pipelines across countries
  - Do's and dont's
  - Differences between species/breeds
  - Anything that might be useful for others working with methane emissions

- Expect GMG partners & others contribute material/information

- **Feedback is welcome! Start a discussion!**
  - If you have information you would like to add to a specific page
  - If you notice information that is wrong, no longer up to date or incomplete
- Click on the discussion button at the top of the page

Section 20 – Methane Emission for Genetic Evaluation

Page   Discussion

  - Fill in a subject and description and add the topic
  - The writers of the pages and everyone else can comment on these topics
- Would like to add information, feel free to open a discussion on the main page

CleanBreeding: Global optimization of breeding for reduced methane emissions in small ruminants

Daniel Brown

agbu

International Sheep Powerhouse

Collaboration with existing activities

Project Team

- Project Lead: Daniel Brown

- Program Leaders:

    - Australia   Dr Micheal Aldridge

    - New Zealand   Dr Suzanne Rowe

    - Uruguay   Dr Gabriel Ciappesoni (and Dr Elly Navajas)

    - Ireland   Dr Noirin McHugh

    - United Kingdom   Dr Nicola Lambe

- Collaboration with many other through linked projects

agbu

Project Plan

- Provide more equipment to speed up measurement

- Measure methane across multiple counties

    - Australia

    - New Zealand

    - Uruguay

    - Ireland

    - United Kingdom

- Mostly with PACs but some with greenfeeds

- Combined data and conduct genetic analysis

- Provide microbiome samples for analysis by others

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Recording Aims

Country	Breed Type	Y1	Y 2	Y3	Y4	Total
Australia	Merino		2,000	2,000		4,000
	Maternal		1,000	1,000		2,000
	Terminal		700	700		1,400
Uruguay	Merino	170	320	320	100	910
	Texel	100	200	200	100	600
	Dohne	100	200	200	100	600
	Corriedale	130	280	280	200	890
New Zealand	Merino	100	500	500	100	1,200
	Maternal Comp	200	500	500	200	1,400
	Texel	200	500	500	200	1,400
United Kingdom	Maternal					0
	Terminal	300	300	300	300	1,200
Ireland	Maternal Comp		250	250		500
	Terminal Comp		250	250		500
total		**1,300**	**7,000**	**7,000**	**1,300**	**16,600**

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Key Outcomes

- Collation of historical data into a combined dataset

- A minimum of 16,000 new phenotypes for methane on genotyped animals

  - feed intake traits and microbiome through collaboration

- Accurate breeding values and indexes for all countries

- New proxy measures of methane and possibly feed intake to deploy to use as selection criteria

- Development of training and knowledge transfer programs and resources

Other outcomes

- International sheep powerhouse working as a team

- Joint reference population for more accurate of genomic prediction

- Earlier estimates of parameters and correlations with other traits.

- A united international voice to lobby and inform industry and policy-makers

- Mentoring and development of early career researchers and instant international collaborator network

- Fast tracked development and validation of new measurement technology

- A framework for international data sharing and database development.

- Foundation for joint R&D into the future

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Thank You