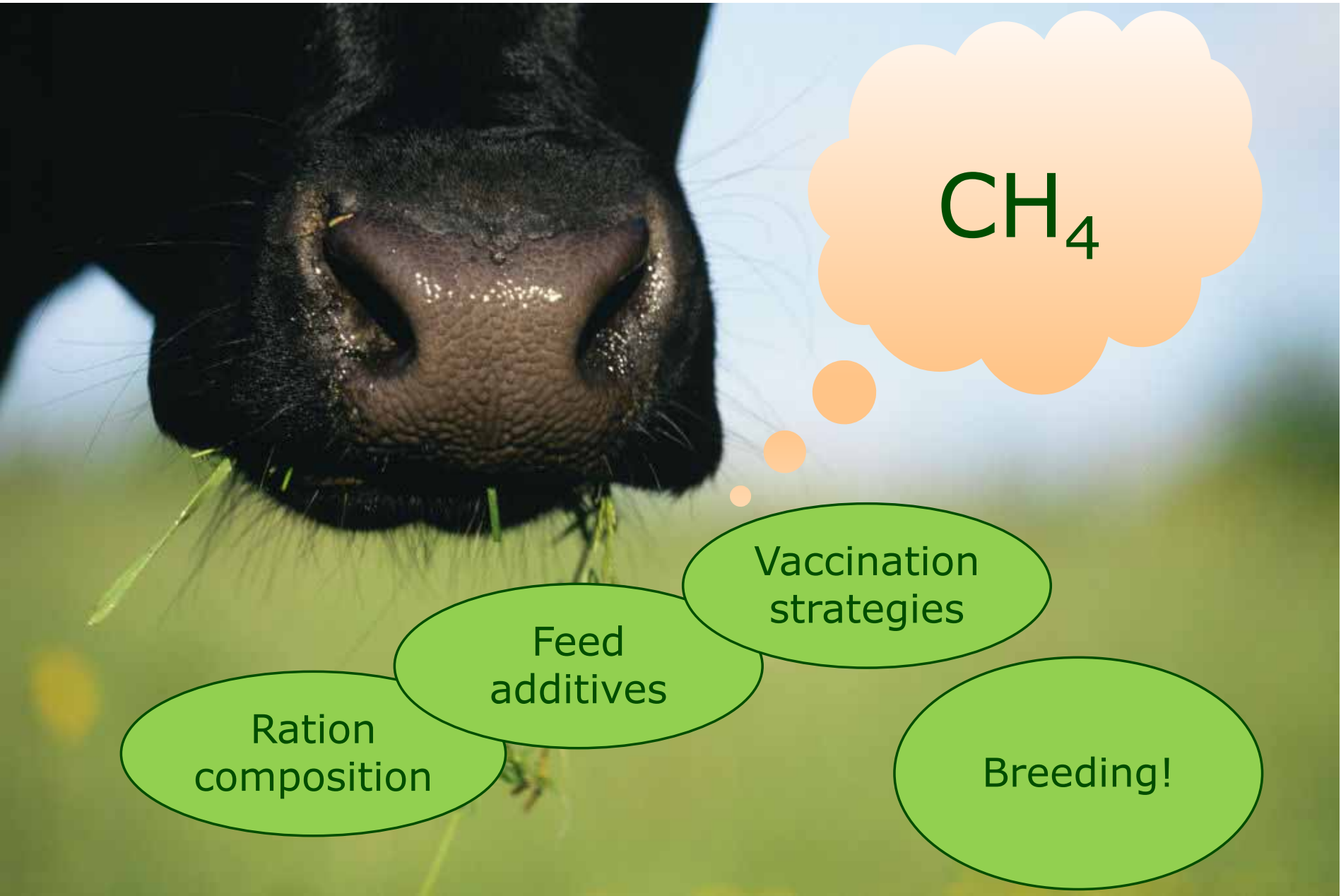


A new ICAR test facility to validate sniffer devices that measure CH₄ output of dairy cows

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Vaccination strategies

Feed additives

Ration composition

Breeding!

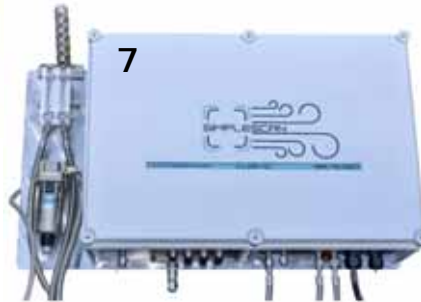
Develop protocols for methane recordings



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

Commercially available sniffers

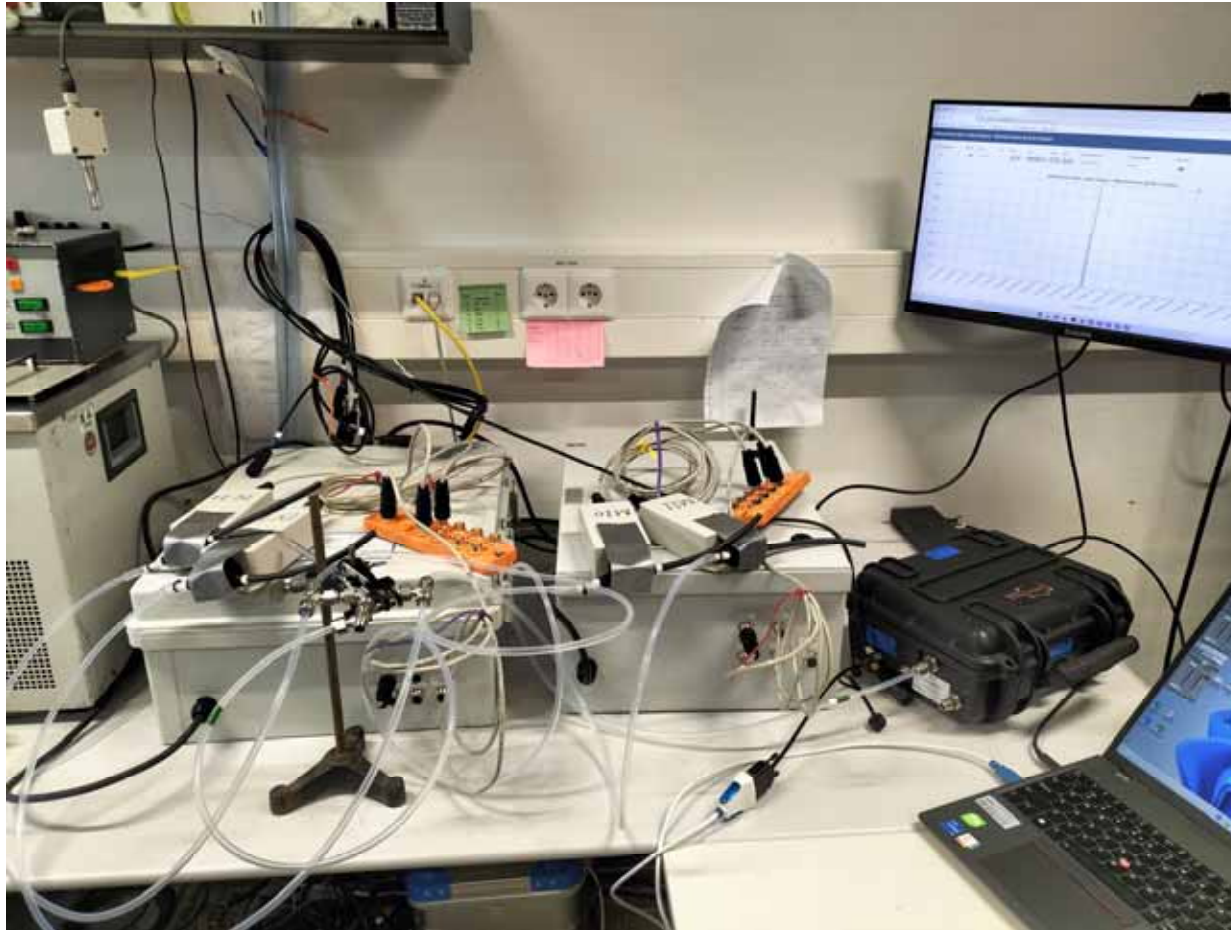


<https://carltech.nl/en/products>
<https://agscent.com/products/agscent-air/>
<https://gasera.fi/product/gasera-one-pulse/>
Arcoflex: <https://doi.org/10.1016/j.cej.2025.165629>
<https://edinburghsensors.com/products/gas-monitors/>
<https://www.tecnosens.it/en/Tecnosens-products/moologger>
<https://www.c-lockinc.com/products/emissions-monitoring/simplescan>
<https://www.gasmet.com/products/category/portable-gas-analyzers/gt5000-terra/>

Specifications

- Type of (infrared) sensors used
- Measured gas/gases
- Range of gas measurements
- Response time
- Repeatability
- Accuracy
- Internal data storage
- Interface
- Size & Weight
- IP value
- Price
- ...

Set up lab facility



Results from lab testing

Offered CH ₄ concentration (ppm)	Recorded CH ₄ concentration (ppm)							
	Sniffer 1a	Sniffer 1b	Sniffer 2a	Sniffer 2b	Sniffer 3a	Sniffer 3b	Sniffer 4a	Sniffer 4b
145	147	139	160	198	246	287	200	189
295	295	288	308	328	461	280	349	337
595	592	584	603	588	685	668	647	637
1192	1179	1171	1200	1115	1221	1402	1246	1237
1787	1758	1750	1799	1642	2017	2152	1843	1839

Set up on farm facility



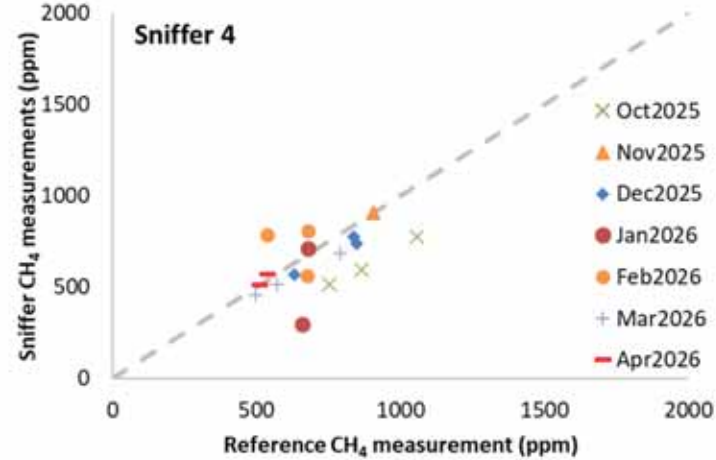
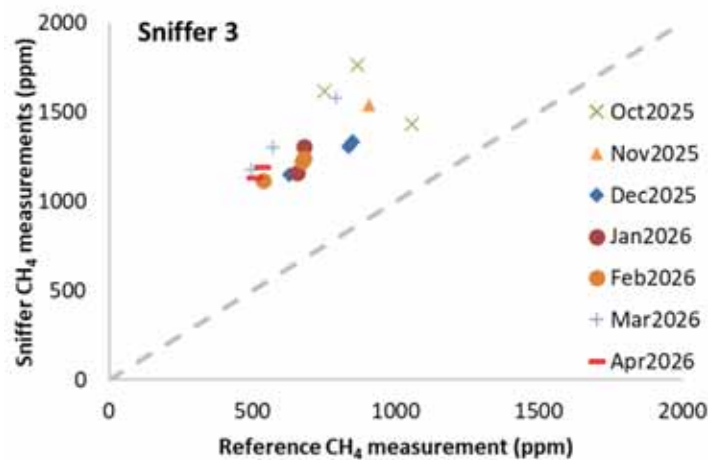
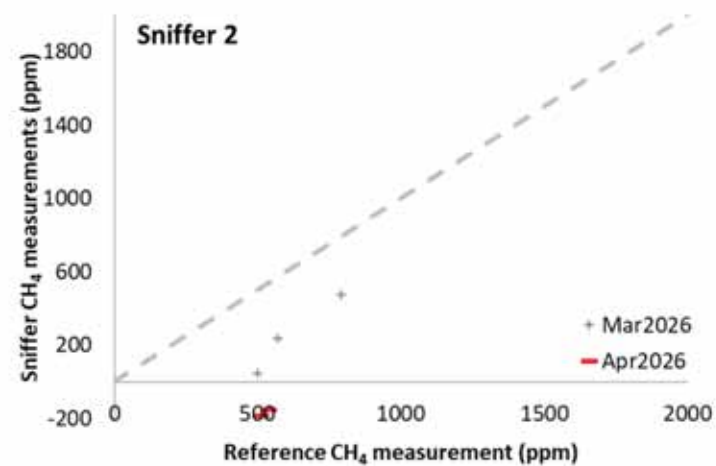
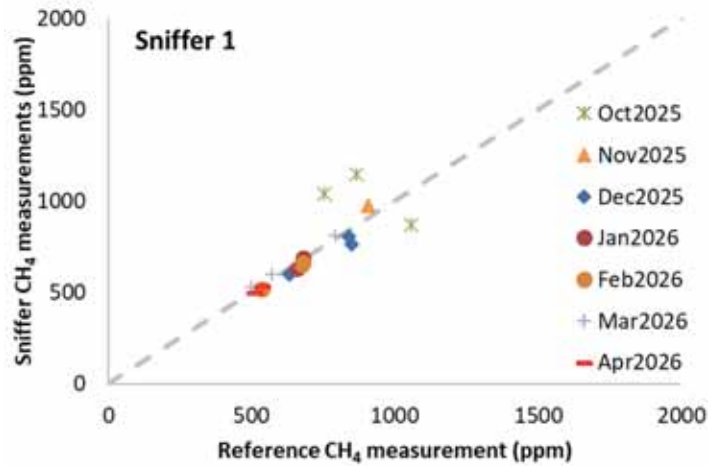
Descriptive statistics

	GreenFeed	Sniffer 1	Sniffer 2	Sniffer 3	Sniffer 4
No. animals	165	171	75	171	167
Avg no. of day	51.3 <i>(2-240)</i>	52.9 <i>(2-186)</i>	3.9 <i>(1-11)</i>	52.4 <i>(2-180)</i>	39.4 <i>(1-145)</i>
Period of recording	10 Sept 2025 27 May 2026	10 Sept 2025 26 May 2026	27 Feb 2026 7 Apr 2026	10 Sept 2025 26 May 2026	10 Sept 2025 14 Mar 2026
	GreenFeed	Sniffer 1	Sniffer 2	Sniffer 3	Sniffer 4
Mean CH ₄	415.7 g/d	813.9 ppm	373.0 ppm	1514.9 ppm	926.8 ppm
Min CH ₄	153.3 g/d	316.9 ppm	-55.1 ppm	792.7 ppm	308.6 ppm
Max CH ₄	650.6 g/d	1511.9 ppm	1081.4 ppm	2126.1 ppm	1541.4 ppm

Set up lung method (= Gold Standard)



Results from lung method



Comparison with the GreenFeed

	Pearson				Spearman rank		
	GreenFeed	Sniffer 1	Sniffer 3		GreenFeed	Sniffer 1	Sniffer 3
Sniffer 1	0.29				0.28		
Sniffer 3	0.18	0.70			0.15	0.62	
Sniffer 4	0.30	0.78	0.74		0.28	0.75	0.74

Next steps

- Sniffers will be for 1 year in total; i.e. until end of September 2026
- All data will then be jointly analysed and reported
- Standard operating procedures will be published on the ICAR wikipege



Conclusions

- There are differences in performance of sniffers to record methane concentrations in the breath of dairy cows
- The lung method is a way longitudinally monitor the performance of sniffers over time
- First results between methane production (g/d, with GreenFeed) and methane concentrations (ppm, with sniffers) show a weak, but positive, correlation

Official ICAR testing centre for validation

Validation of sniffer and other methane recording devices

- I. Air Quality Lab of Wageningen University & Research
- II. Innovation and Research Center Dairy Campus

➤ Now manufacturers can request validation of their devices through ICAR for *ruminant gas production CH₄ and CO₂*

<https://my.icar.org/applications-for-icar-validation/edit/>

Thank you for your attention

Global Methane Genetics initiative

Led by  **WAGENINGEN**
UNIVERSITY & RESEARCH

In Partnership with  **BEZOS EARTH FUND**  **Global Methane Hub**



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