



breed4green

breed4green- measuring methane emissions in commercial farms and establishing a comprehensive dataset for genetic studies

Linke, K.¹, Köck, A.¹, Schmid, C.², Steininger, F.¹, Fuerst-Waltl, B.³, Zollitsch, W.³, Steinwider, A.⁴, Guggenberger, T.⁴, Egger-Danner, C.¹

¹ZuchtData EDV-Dienstleistungen GmbH, Vienna, Austria

²LKV Austria, Vienna, Austria

³BOKU University, Vienna, Austria

⁴Federal Agricultural Research and Education Centre Raumberg-Gumpenstein, Irdning-Donnersbachtal, Austria

Presenting author: linke@zuchtdata.at



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Aim of breed4green

- Research into the **genetic potential for improving feed efficiency and reducing methane emissions** in Fleckvieh and Brown Swiss cattle

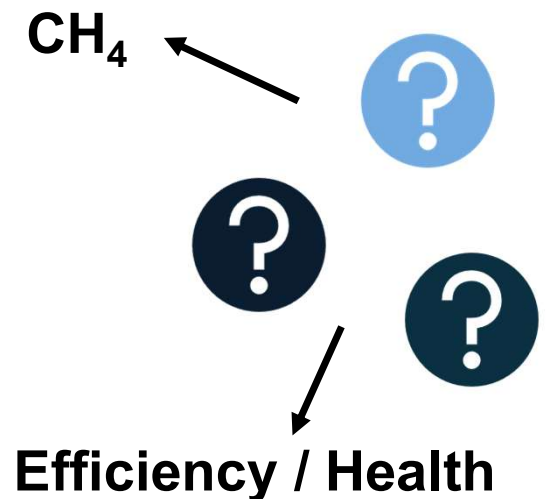


Development of direct and indirect traits*
Genetics (heritability, correlations with other traits in TMI)

- Consideration of these traits in the breeding goal and breeding program* (**after breed4green*)



methane ↓
feed efficiency ↑



* Session 29: Köck et al.: Prediction of methane using milk mid-infrared spectra

Station data

Raumberg-Gumpenstein and Moarhof

Feed intake and information on ration, methane and CO₂ measurements, DHI and MIR-spectra every 2 days, AMS (daily milk yield, milking interval), sensor, body weight, BCS, health information, claw trimming data, environmental factors;

Farms

25 Fleckvieh and 5 Brown Swiss dairy farms

Methane and CO₂ measurements, DHI and MIR spectra monthly + weekly during GreenFeed period, rations and feed analysis, AMS or MMG (daily milk yield, milking interval), sensor, body weights during GreenFeed period, over 15 months (BCS, health information, claw trimming data, feeding), environmental factors, FoKUHs genotyping

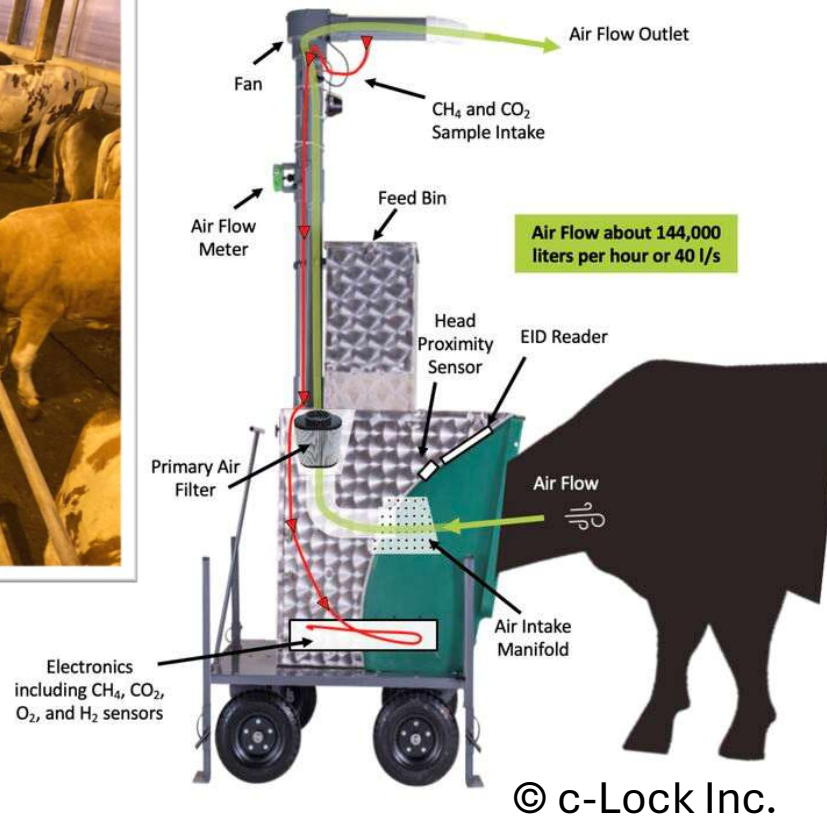
DATA

for research in breed4green

Additional data from RDV (central cattle database) and projects Rinderzucht AUSTRIA

Data from external cooperations

Methane measurement - GreenFeed

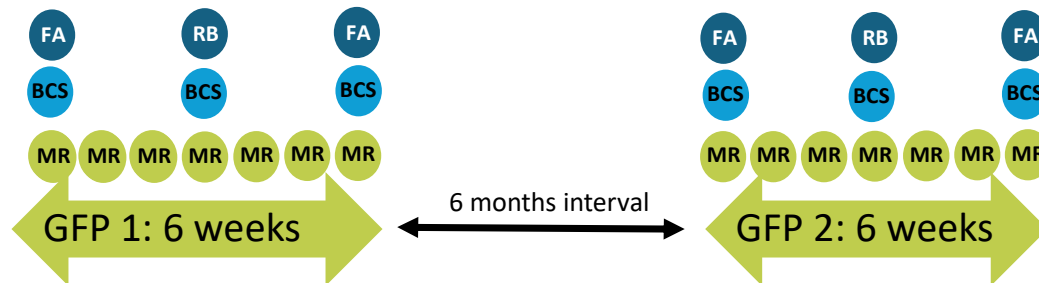


Overview data recording in breed4green



GreenFeed periods (GFP) 1 & 2 (6 weeks each):

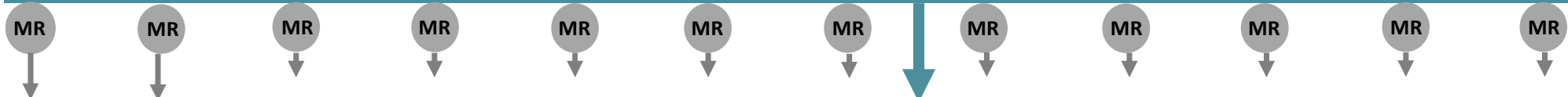
Methane and CO₂ measurements (GreenFeed)
body weights several times daily (automatic scales)



GreenFeed periods (GFP) 1 & 2:

DHI und MIR spectra weekly
BCS 6x
feed analysis (FA) 4x
farm data, husbandry
ration analysis (RB) 2x

breed4green data recording 15 months on each farm (30 farms: 12/23 - 10/27)



At each DHI visit
(MR):

Milk yield&contents
MIR spectra
Body condition score
Locomotion score
Ration

Recording for 15 months on each farm:

Day 7 and 14 after calving: ketosis tests and recording of feeding behavior, prophylaxis, health information, claw trimming data, daily milk yield, milking interval (AMS / MMG data)
genotyping of all animals, ration composition,
if available concentrate feeding station data and sensor data



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Overview records - GreenFeed

Animals with at least 19 GreenFeed spot samples



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Year	Farm	Period 1	Period 2	Period 1 or 2
2024	A	45	37	59
	B	43	37	57
	C	32	39	40
	D	34	32	38
	E	44	37	56
	F	17	24	28
	G	19	24	28
	H	45	51	54
	I	37		37
2025	AA	42		42
	BB	26		26
Total		384	281	465

breed4green data - breed

Breed of the 465 animals with at least 19 GreenFeed spot samples

Breed	Number of animals
Fleckvieh	365
Brown Swiss	90
Holstein	8
Pinzgauer	2



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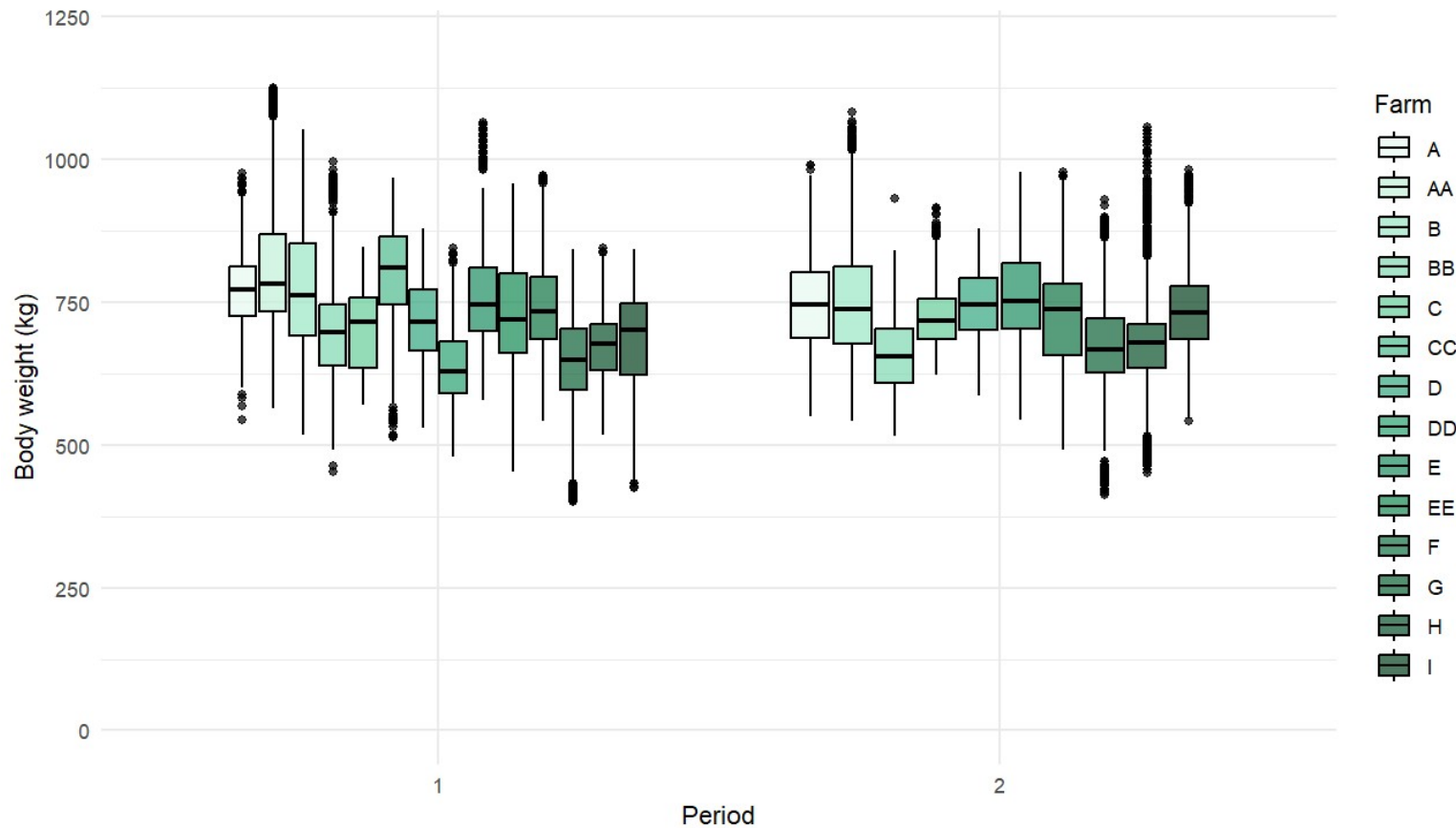


Body weight

Differences between farms



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Milk yield

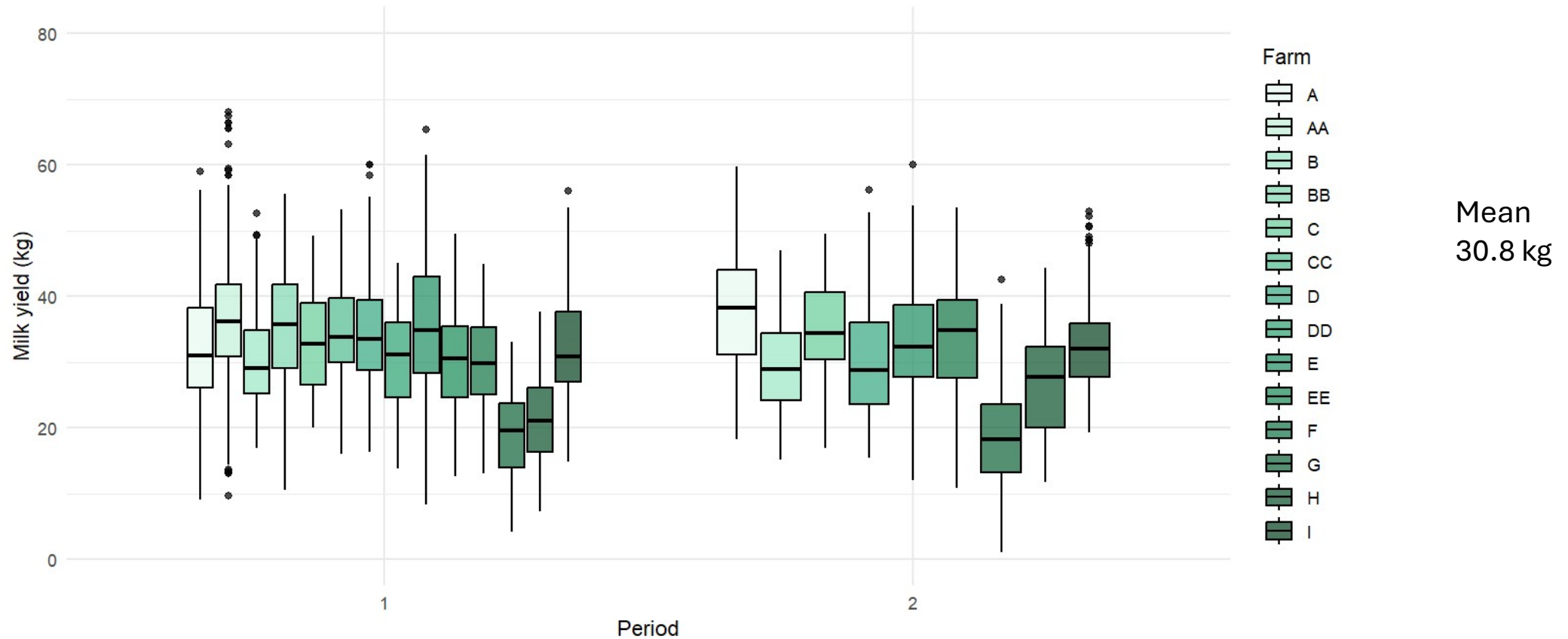
Differences between farms



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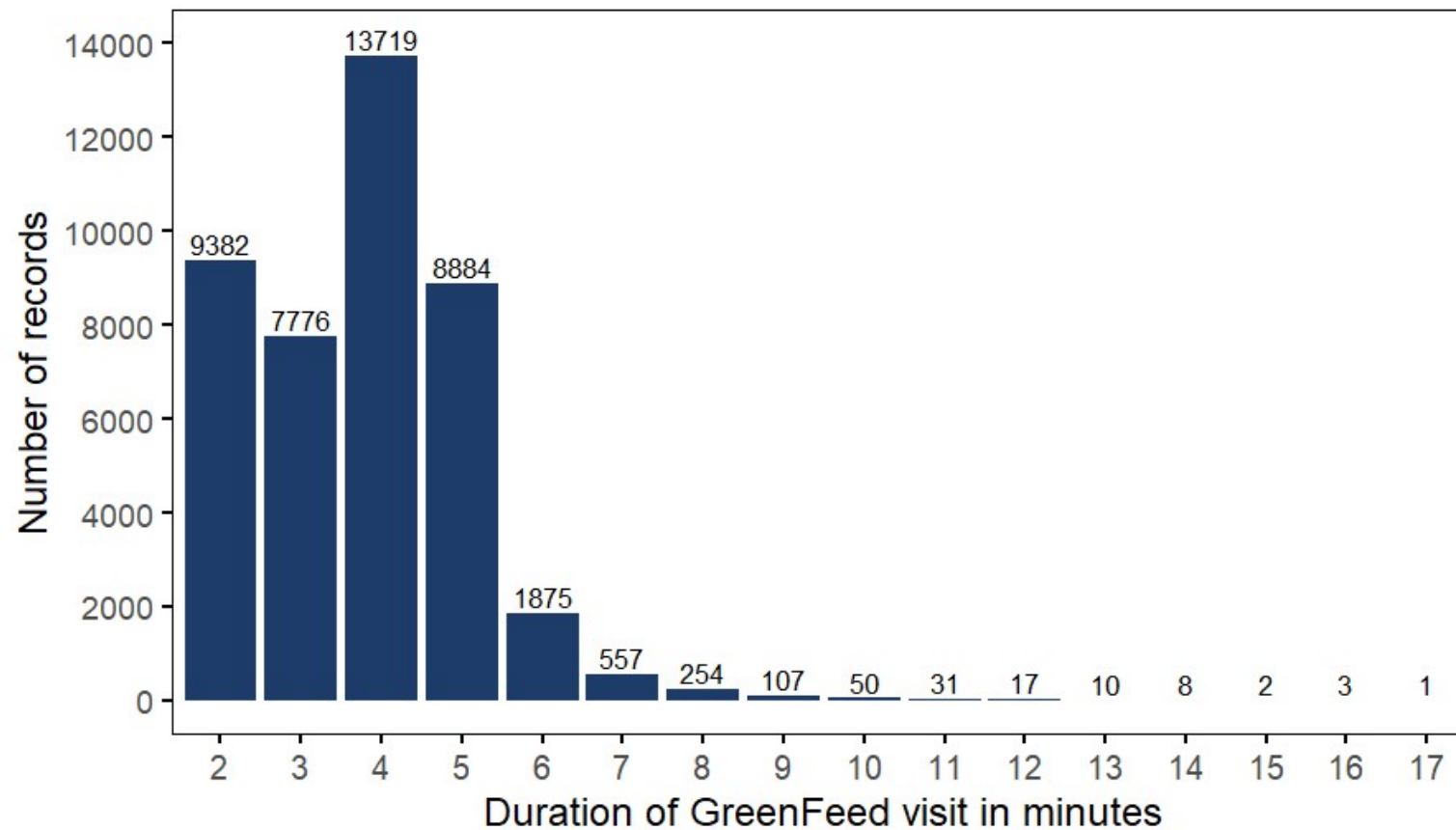
ZUCHT
DATA



Duration of GreenFeed visits



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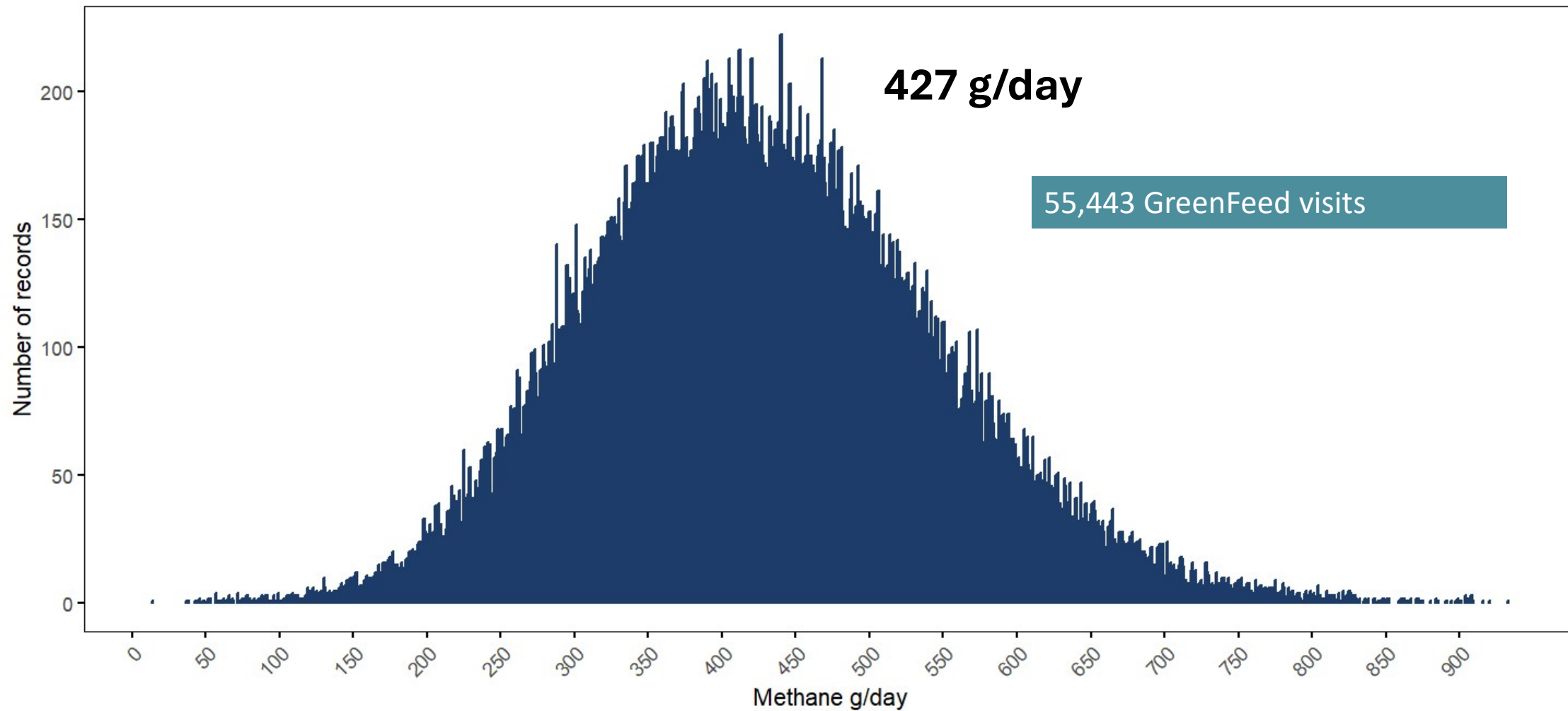
Methane measurements



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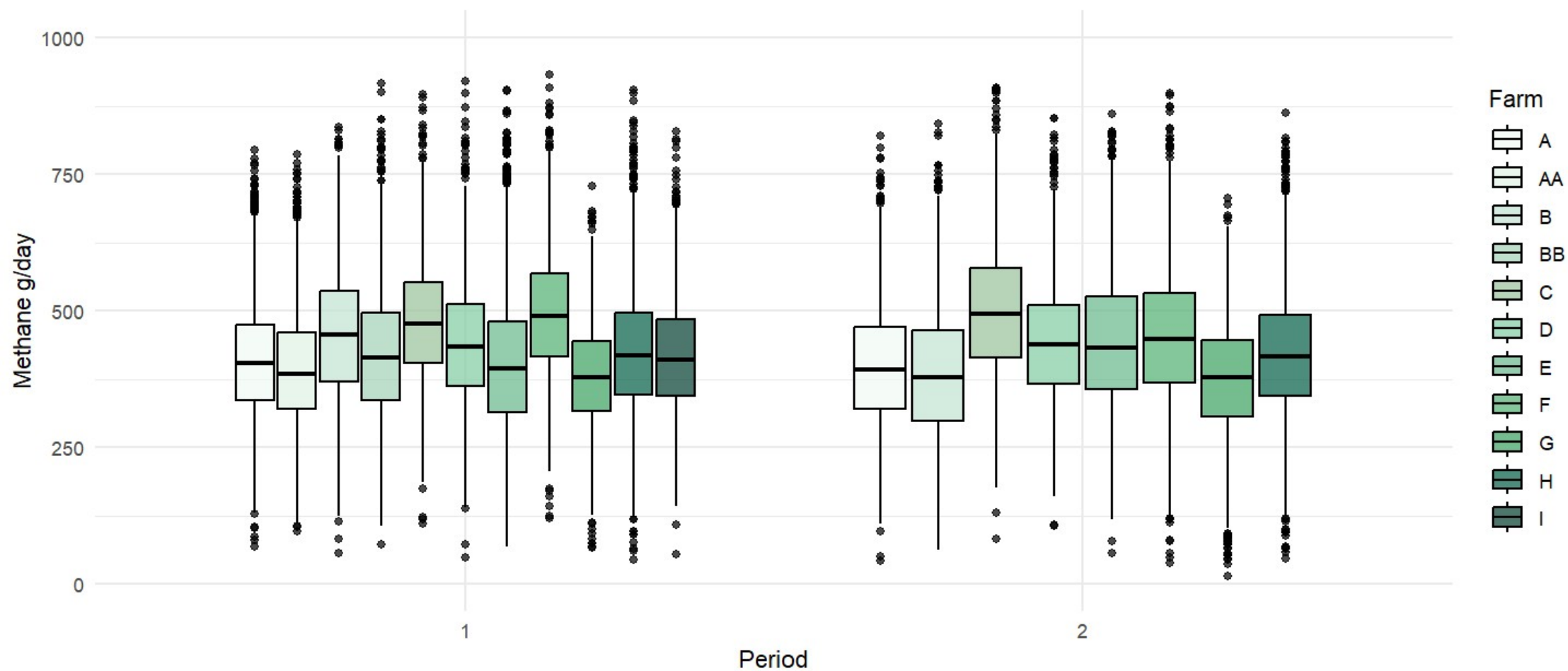
ZUCHT
DATA



Methane – differences between farms



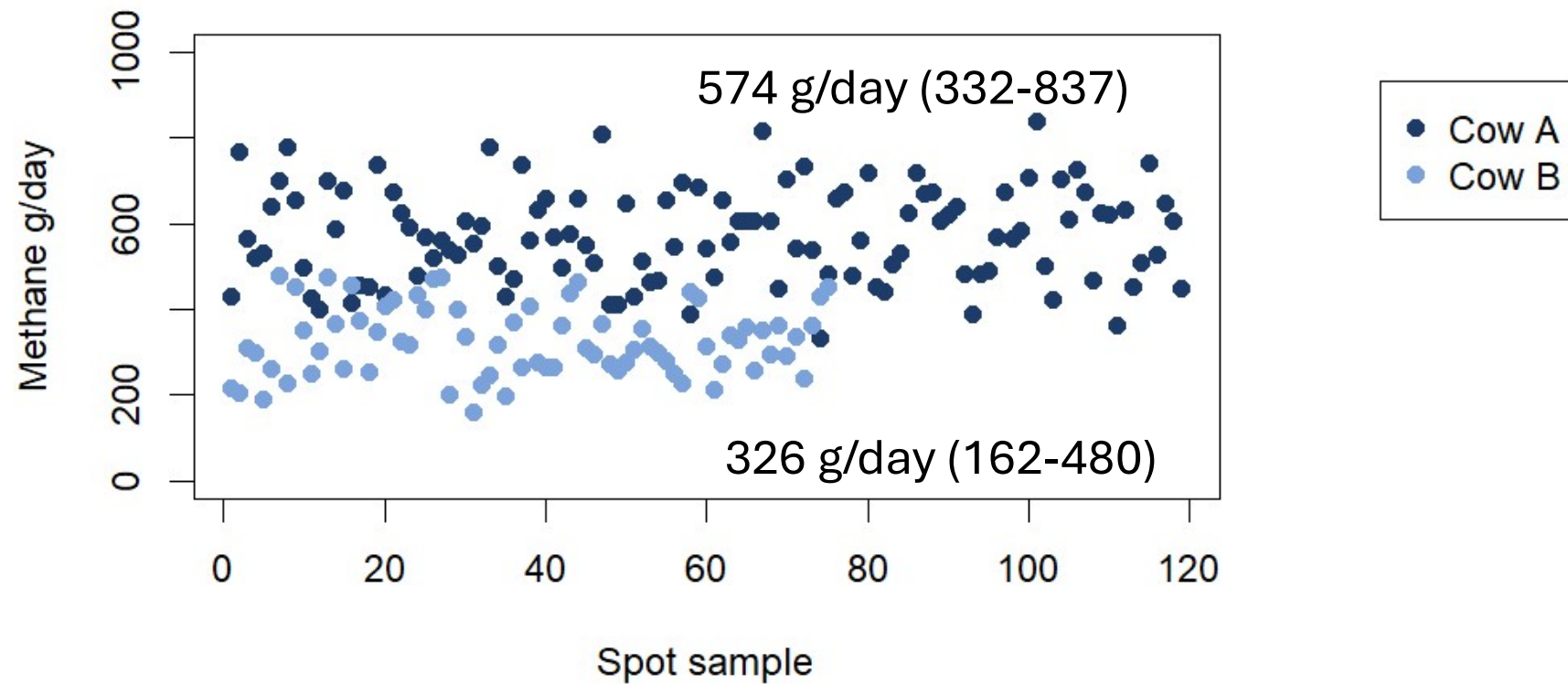
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Methane - differences between animals



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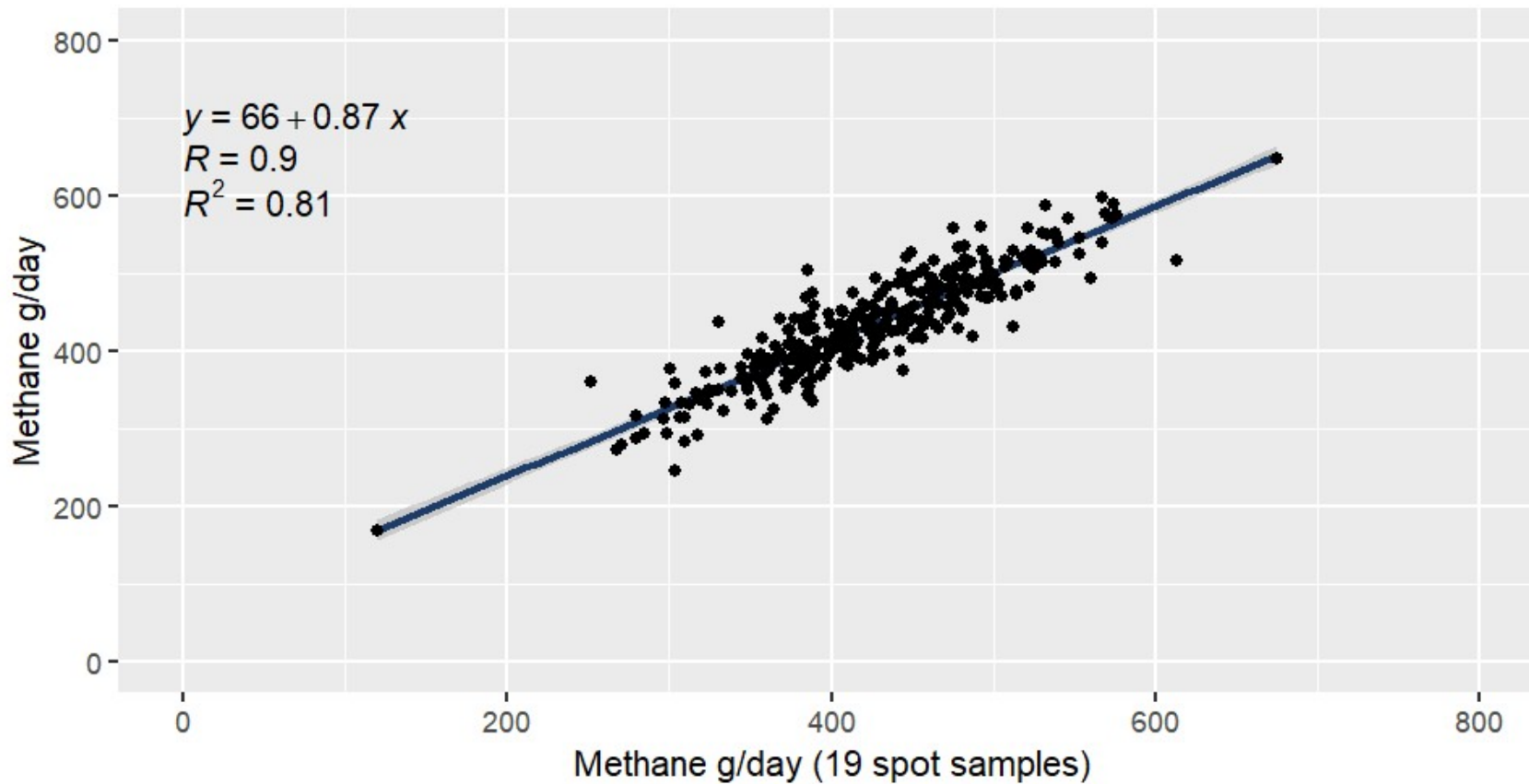
Methane

How many GreenFeed visits are required per animal?



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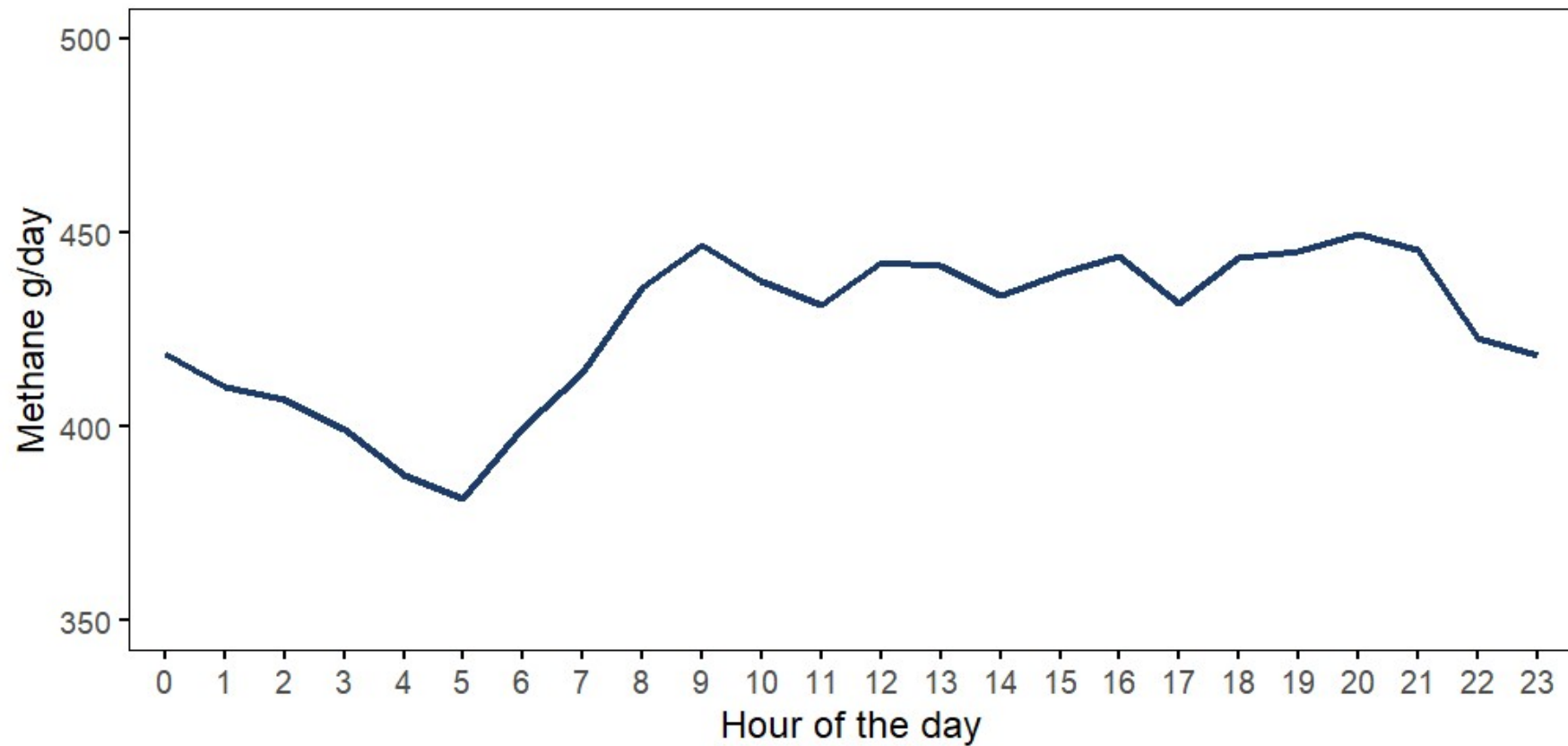
323 animal records with more than 70 measurements



Methane - diurnal variability



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Heritability – Fleckvieh

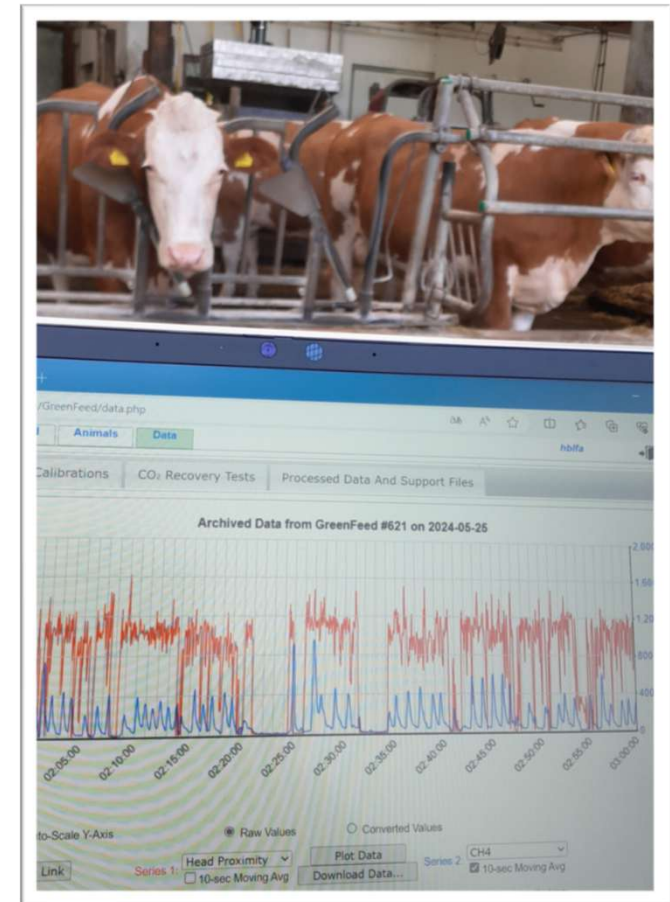
6 farms, 201 cows



Trait	Number of datasets	Number of cows	Heritability
Methane	1,189	201	0.206 (± 0.141)
Residual methane	828	179	0.296 (± 0.159)
Body weight	1,179	217	0.198 (± 0.190)
Milk	1,362	249	0.233 (± 0.163)

Summary

- Recording of methane emissions on farms is feasible with GreenFeed
- Methane emissions show a high variability, daily fluctuations and differences between farms and animals
- A minimum of 19 measurements was required to determine methane emissions for one animal
- Heritabilities show potential for genetic improvement



Thank you for your attention!



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