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Sheep Ireland
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Breeding for reduced greenhouse gas emissions in sheep

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UK Texel Breed Development Committee, 23rd May 2023

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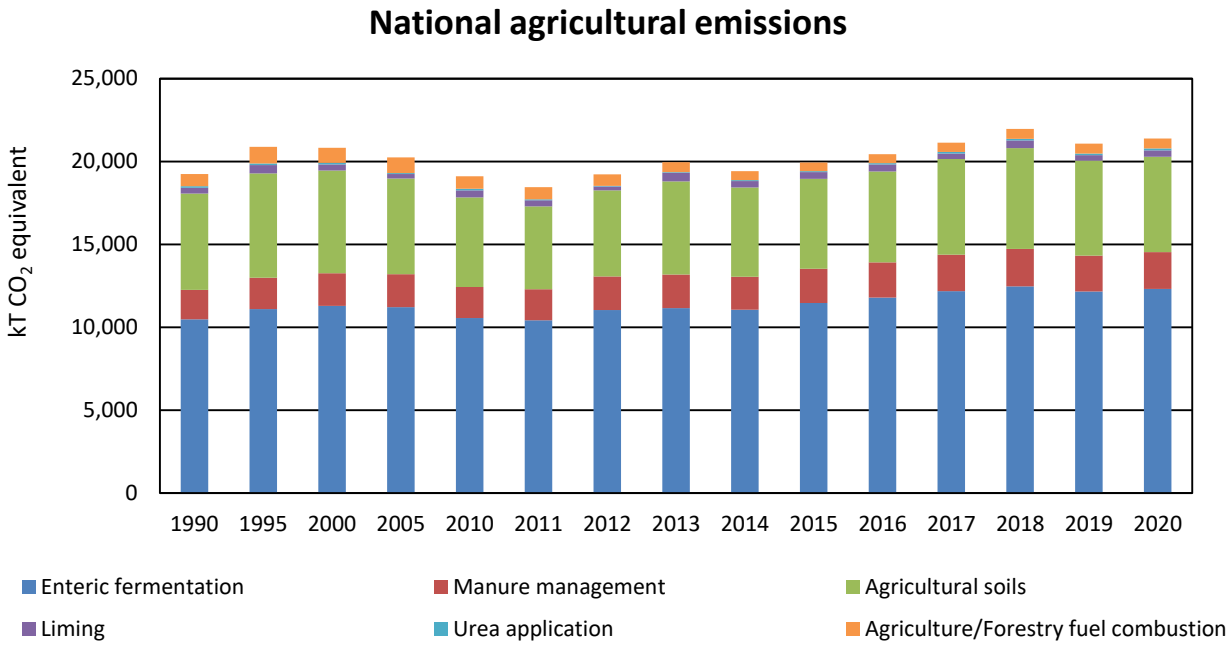
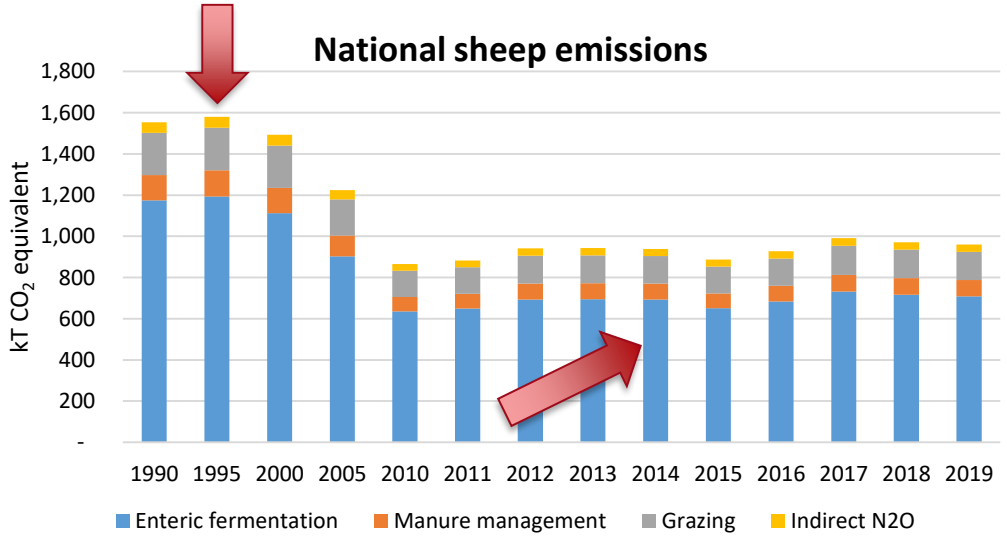
National GHG emissions



- 37% national GHG emissions
- Dominated by cattle related emissions



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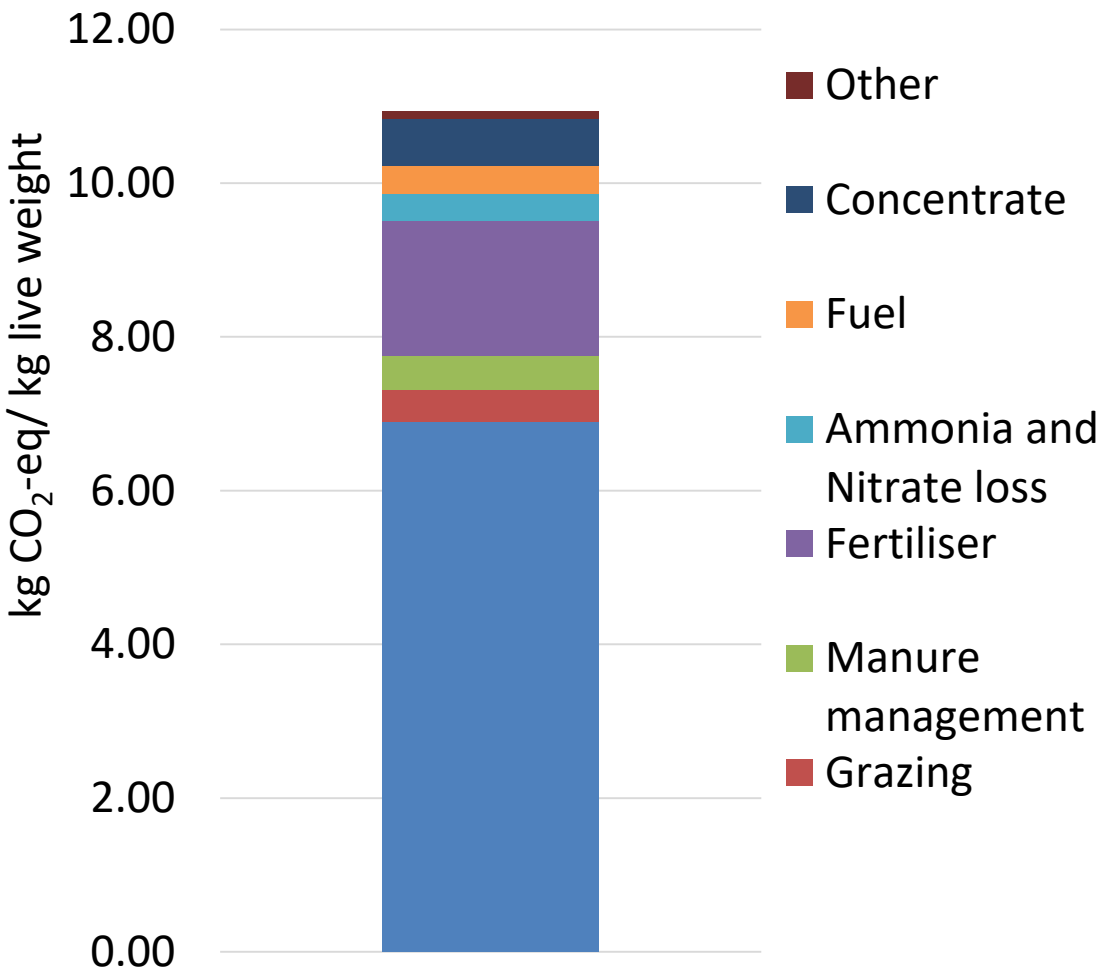
National Average

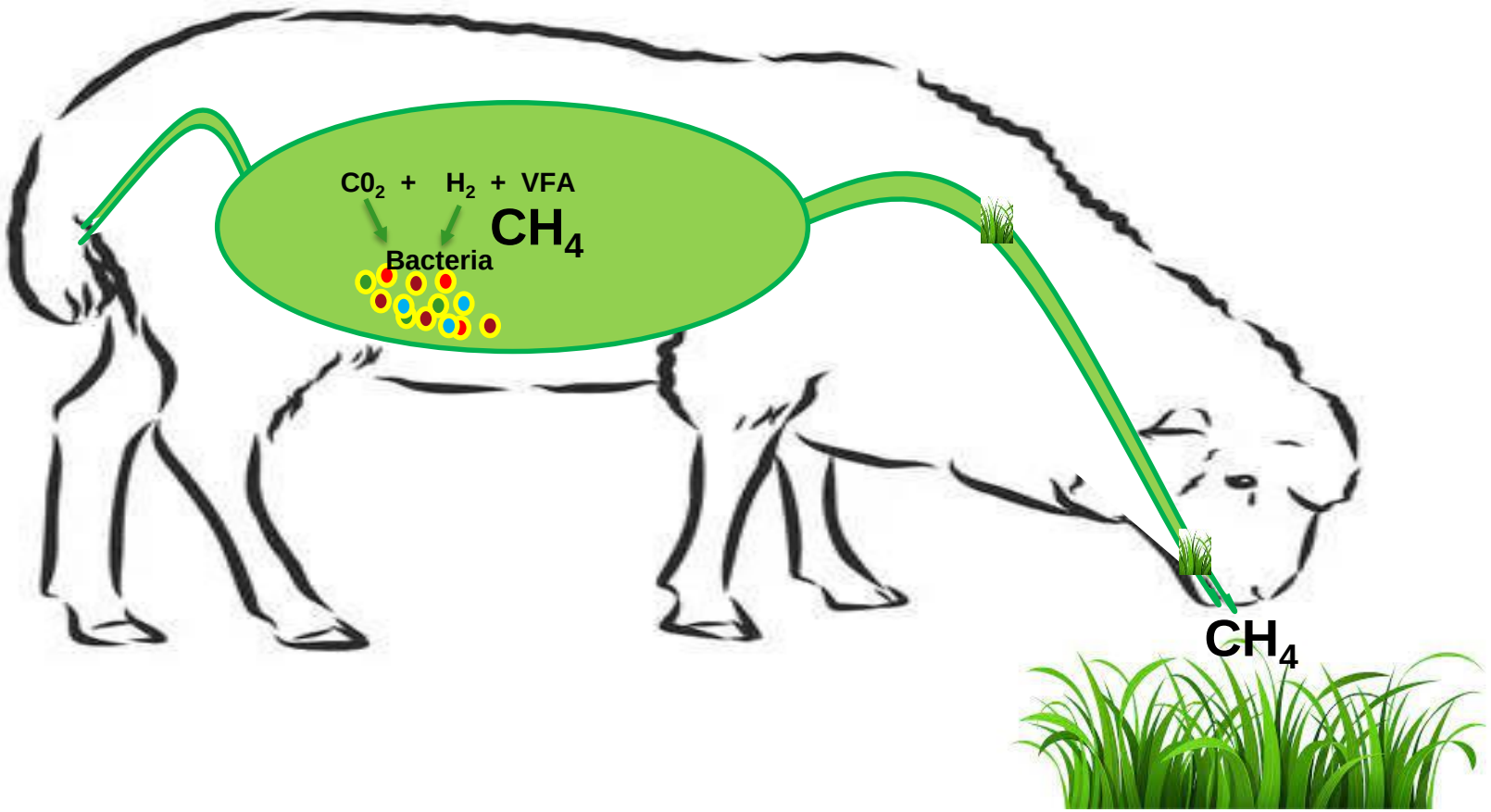
Methane = 64%
Mostly enteric fermentation

Nitrous oxide= 20%
Fertiliser, grazing and manure

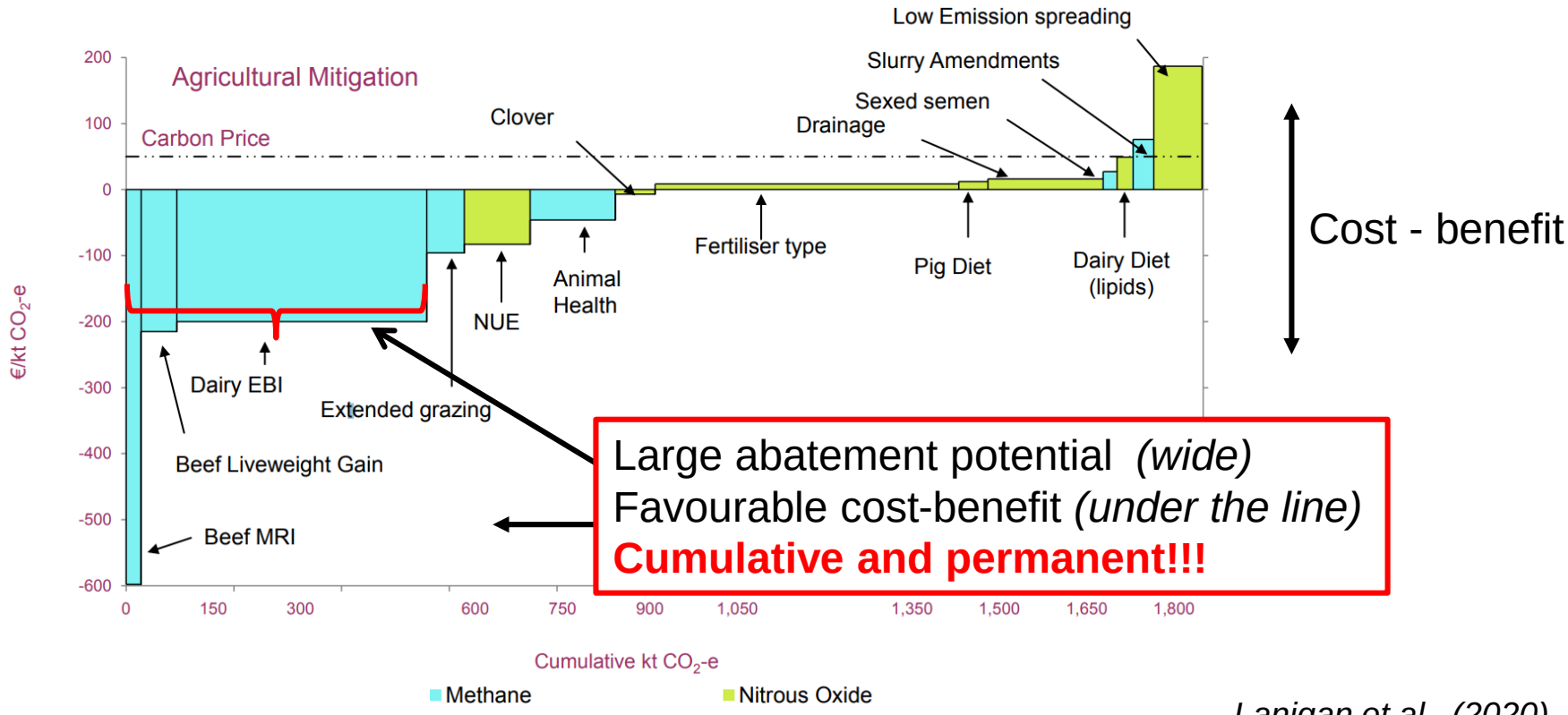
Carbon dioxide = 16%
Concentrates and fossil fuels



Enteric Fermentation



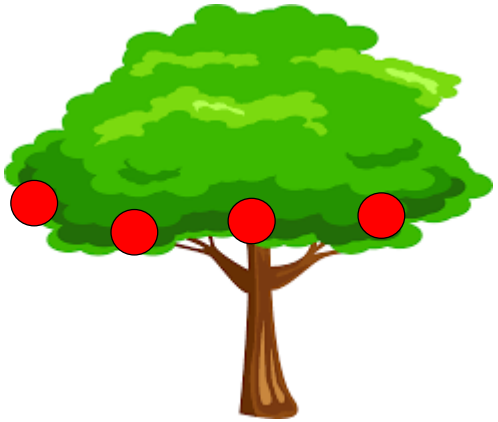
Marginal Abatement Cost curve (MACC)



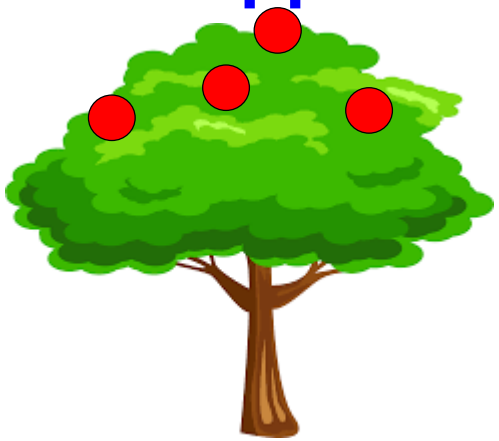
Lanigan et al., (2020)

Two-pronged approach

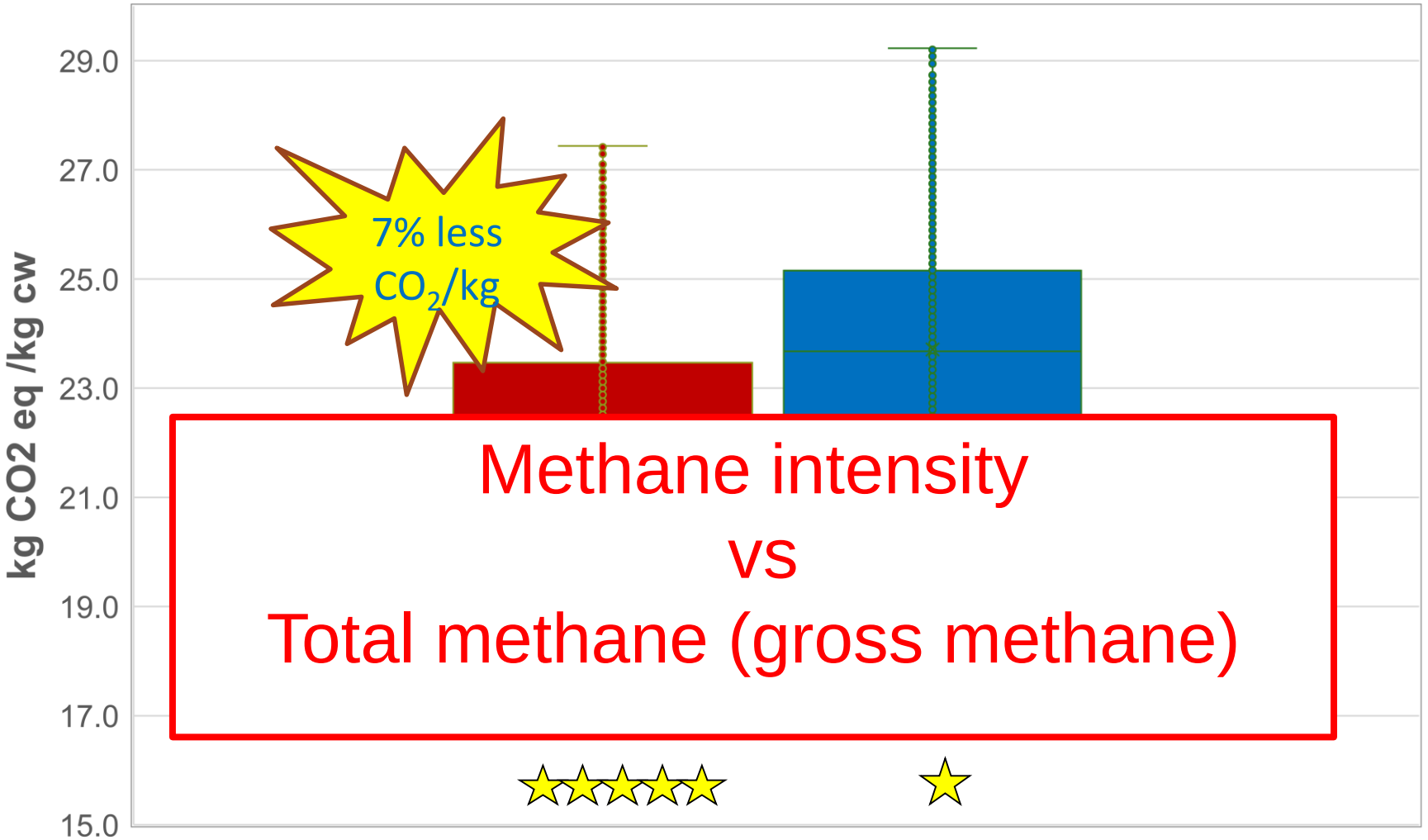
Indirect approach



Direct approach

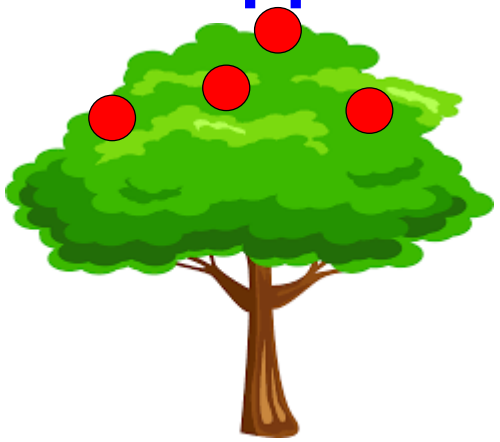


€uro-star genetic indexes

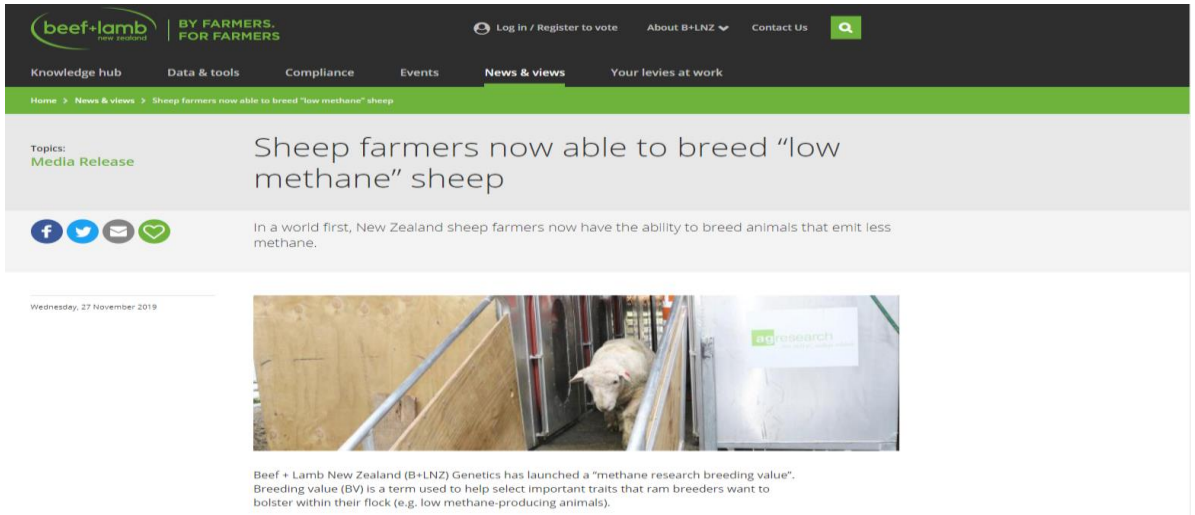


Why measure methane?

Direct approach



- Identify high and low emitters in the flock
- Develop breeding values for methane



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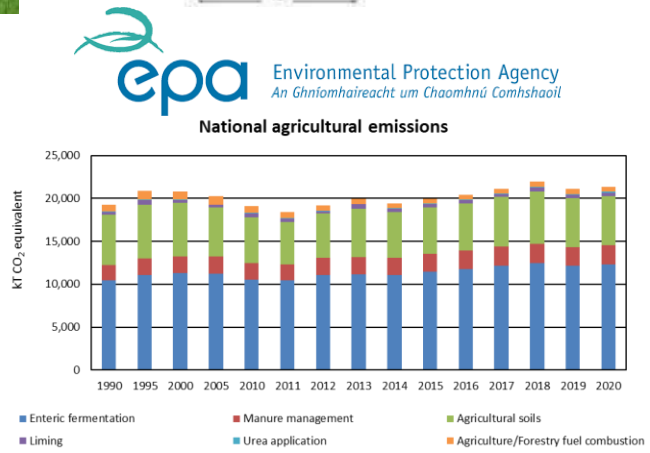
Methods of measurement

PACs | Respiration Chamber | GreenFeed



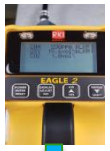
Data Collection

Methane measurements collected using PAC

Removed from feed 1hr prior

Live-weight recorded

PAC 50mins



CH4, CO2 and O2 at 0 & 50min

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Results

	Lamb	Hogget	Lactating Ewe	Dry Ewe	Pregnant Ewe
No. recs	3,014	936	815	5,742	119
No. animals	689	494	455	4,145	60

Methane (g/day)

19.89

0.4-0.6 g CH_4 per kg live-weight

Genetics of methane (ewes)

- Variation between ewes for methane?

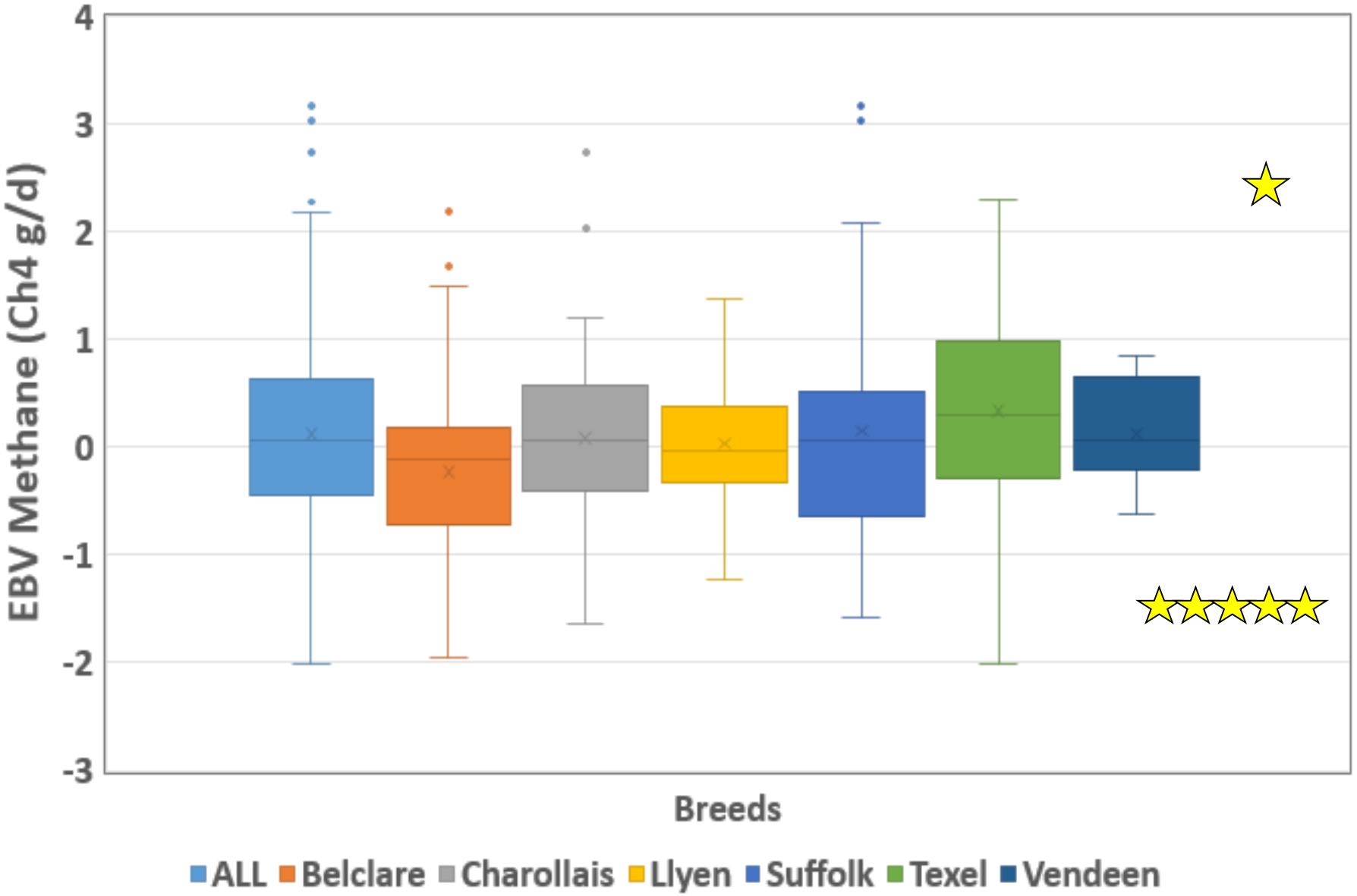
Results to date

Measurement	No. Ewes	Avg methane	Heritability	Repeatability
Lactating	661	26.80 (6.60)	27%	48%
Dry	3,656	19.89 (6.95)	19%	43%

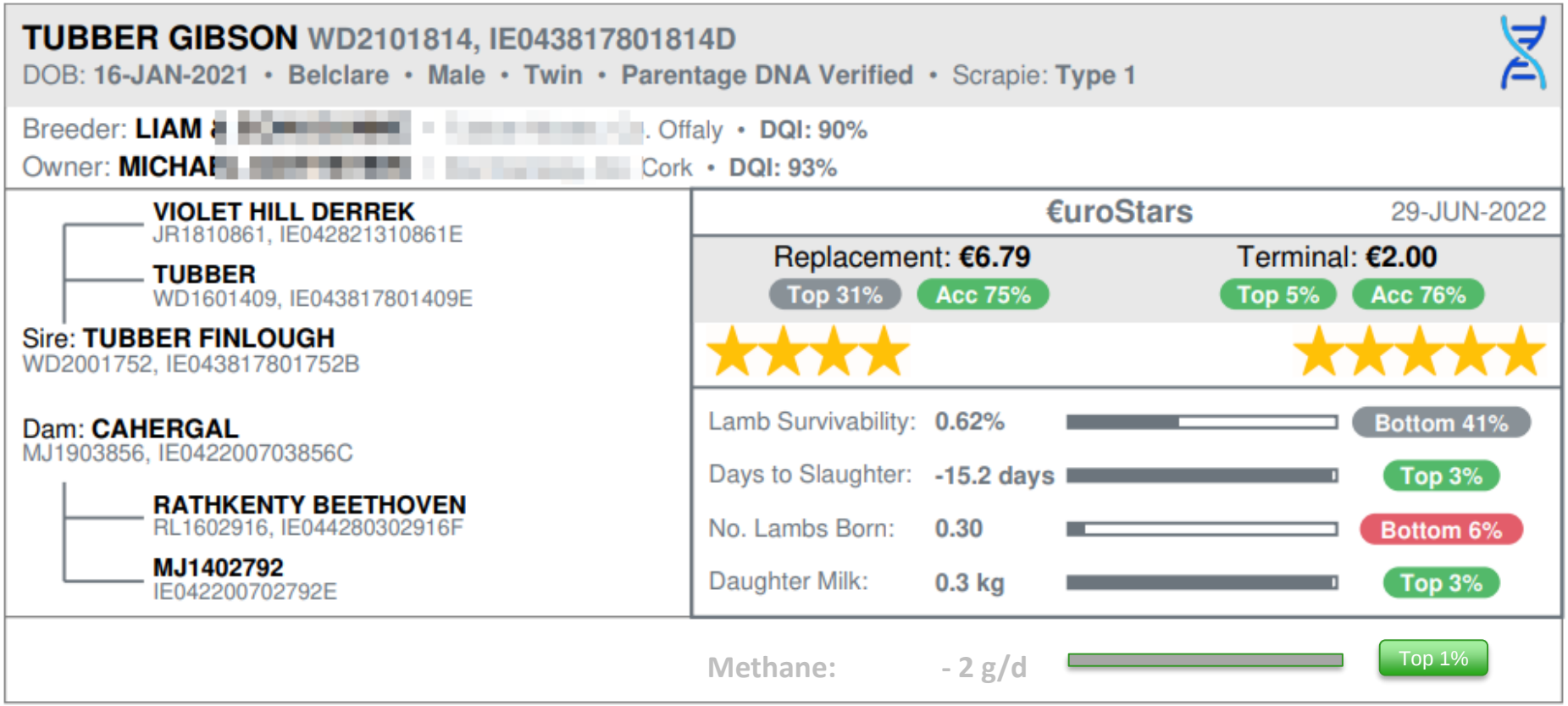
Combining ewe datasets

Correlation 0.72 → same trait

Breed differences



Next steps



TUBBER GIBSON WD2101814, IE043817801814D
DOB: **16-JAN-2021** • **Belclare** • **Male** • **Twin** • **Parentage DNA Verified** • Scrapie: **Type 1**

Breeder: **LIAM** [redacted]. Offaly • **DQI: 90%**
Owner: **MICHA** [redacted] Cork • **DQI: 93%**

VIOLET HILL DERREK
JR1810861, IE042821310861E

TUBBER
WD1601409, IE043817801409E

Sire: **TUBBER FINLOUGH**
WD2001752, IE043817801752B

Dam: **CAHERGAL**
MJ1903856, IE042200703856C

RATHKENTY BEETHOVEN
RL1602916, IE044280302916F

MJ1402792
IE042200702792E

€uroStars 29-JUN-2022

Replacement: **€6.79** — Top 31% — Acc 75% — ★★★★

Terminal: **€2.00** — Top 5% — Acc 76% — ★★★★★

Lamb Survivability:	**0.62%**	Bottom 41%
Days to Slaughter:	**-15.2 days**	Top 3%
No. Lambs Born:	**0.30**	Bottom 6%
Daughter Milk:	**0.3 kg**	Top 3%
Methane:	**- 2 g/d**	Top 1%

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Conclusion

- Methane measurements underway in sheep
  - Measuring commercial & pedigree flocks
- Results to date methane is under genetic control
  - Link to production traits
  - breed low emitters with high levels of performance
- Carbon sub-index to be developed
  - Incorporate into the Terminal & Replacement Indexes

Acknowledgements

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

GreenBreed (17/S/2135)

GrassToGas

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ICT AGRI era-net

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Thank you for your attention

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