Measuring methane in sheep systems

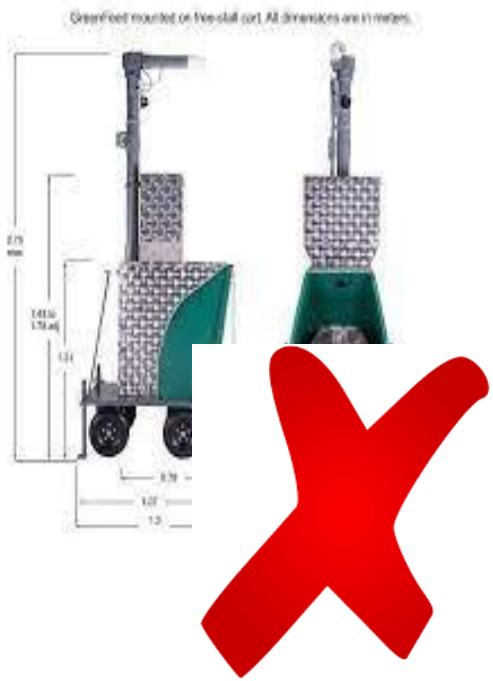
Agriculture and Food Development Authority

Methods of measurement

PACs

SF_6

GreenFeed



Respiration Chamber

Methods of measurement

Respiration Chamber

- 1 animal per chamber
- Animals enclosed for 48hrs

- Pros
  - Deemed the ‘gold standard’
  - Allows for DMI and water intake
  - Values accepted to national inventory
- Cons
  - Low animal throughput
  - Expensive technique
  - Labour intensive
  - Unnatural environment for the animal

Methods of measurement

SF_6

- Individual equipment required per animal
- Measurement run takes 6 days

- Pros
  - Correlates well to RC (0.69, Munoz et al., 2012)
  - Allows animals to be measured at pasture
  - Values accepted to national inventory

- Cons
  - Low animal throughput
  - Expensive technique
  - Labour intensive

Methods of measurement

PACs

- 12 animals per run (72 per day)
- Measurement run takes 50min

- Pros
  - Correlates well to RC (0.55, O'Connor et al., 2021)
  - Allows animals to be measured at pasture
  - Higher animal throughput
  - Labour efficient

- Cons
  - Used as a ranking tool only
  - Equipment is moisture sensitive

Data Collection

Methane measurements collected using PAC

Removed from feed 1hr prior

Live-weight recorded

PAC 50mins

CH4, CO2 and O2 at 0, 25 & 50min

Data Collection

Methane recs

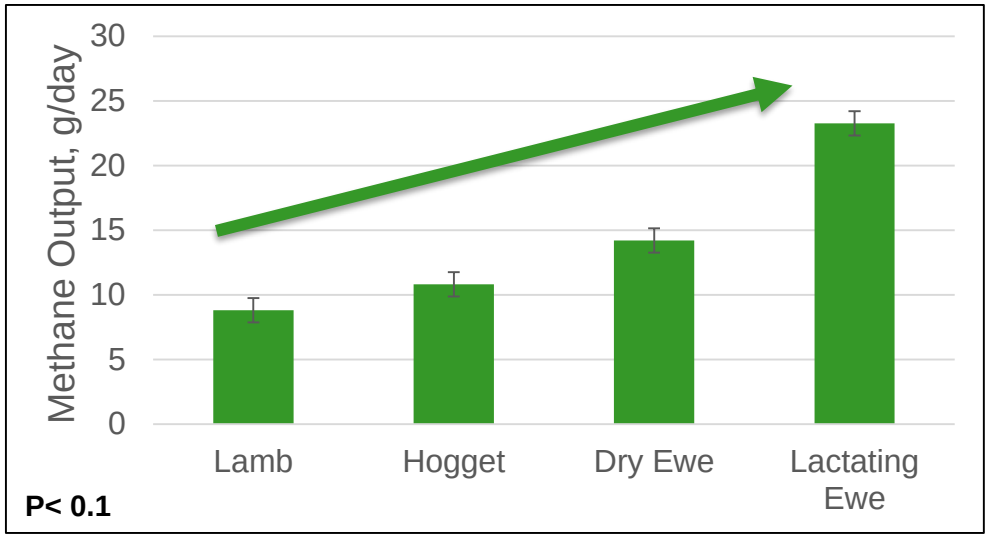
Final dataset

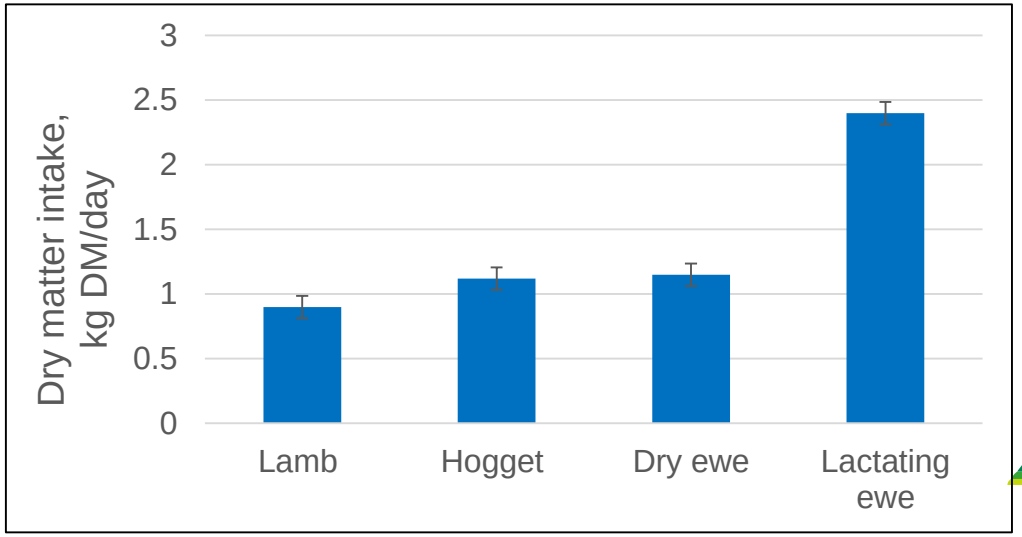
7,123 methane records

- 1,803 lambs
- 862 hoggets
- 4,458 ewes

2,692 animals
4 sheep flocks

The effect of life-stage on the ranking of methane output and DMI in sheep





Comparing methane output from ruminants

Respiration Chamber, g/day	469	205	29.5
SF6, g/day	422	189	37.3

0.4-0.6 g CH_4 per kg live-weight

Munoz et al., 2012 Jonker et al., 2016

Factors affecting methane output

Age + parity (ewe)

Diet type

Live-weight + wean weight (lambs)

Time off feed

BCS

Rearing litter size (ewe)