Forage for CH4nge

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Sheep Grazing & Greenhouse Gas Emissions

Defra funded a farmer-initiated pilot study to investigate how upland sheep grazing systems impact greenhouse gas emissions. This summary provides practical insights for farmers and the wider livestock sector.

Key questions

- Does a native upland breed produce lower emissions on forages they are adapted to than an "improved" breed type?
- Do some forage types produce lower emissions?

Study resources

- 120 ewes (Swaledale and Texel/Swaledale crossbred)
- Grazed 3 vegetation types: improved grassland, species-rich grassland & moorland
- Methane (CH_4) and carbon dioxide (CO_2) emissions measured using portable accumulation chambers (PAC)
- Animal liveweight and body condition scores were collected through the study

Key findings

Methane emissions:

- Swaledale ewes produced less methane than crossbreds, due to their smaller size
- Adjusting methane emissions per animal for liveweight eliminated this breed effect
- Ewes on improved grassland produced more methane, compared to other forage types

Carbon dioxide emissions (CO_2):

- Swaledale ewes produced less CO_2 than crossbreds, even after adjusting for weight
- Ewes on improved and species-rich grasslands produced more CO_2 than those on moorland

Weight & body condition:

- Swaledale ewes were lighter with lower body condition scores than crossbreds
- All ewes lost weight after moving to grazing treatments, but most regained some weight between measurement rounds.
- Ewes on the moorland lost the most weight during the trial (Swaledale -4.5% of starting weight, crossbred -7.6%, on average)

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Overall outcomes

- Variation in emissions was influenced by breed and grazing type
- Breed differences in methane were largely due to body size, but breed differences in CO_2 persist even after adjusting for weight (Swaledale < crossbred)
- Sheep grazing moorland or species rich grassland produced 15% lower methane emissions than sheep grazing improved grassland
- Sheep grazing moorland produced 14% lower emissions of CO_2 (carbon dioxide) than sheep grazing improved or species rich grassland
- It is possible that some differences in emissions could be due to animals eating differing amounts of feed prior to emissions measurement. Individual feed intake could not be measured due to cost and practicality at grazing

We could not examine differences in ewe lifetime productivity on different forage types within the timeframe of this study. A larger study could add value by investigating these elements, but would come at a much higher cost than this study.

Key findings

- There was little evidence that breed affects methane emissions if body size is accounted for, but some evidence of slightly lower CO_2 emissions from Swaledale than crossbred sheep.
- Compared to improved grassland, sheep grazing moorland produced lower emissions of both methane and CO_2, while those grazing species-rich grassland produced lower emissions of methane only.

Why does this matter?

- **Understanding how forage type and breed affect greenhouse gas emissions can help farmers make informed decisions to reduce negative environmental impacts.**

For more information, contact the **Forage for CH4nge** team at UK Agri Tech Centre or one of the following project partners

Webpage link: https://www.gwct.org.uk/forageforch4nge

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