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Data Article

Data to calculate emissions intensity for individual beef cattle reared on pasture-based production systems

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ABSTRACT

With increasing concern about environmental burdens originating from livestock production, the importance of farming system evaluation has never been greater. In order to form a basis for trade-off analysis of pasture-based cattle production systems, liveweight data from 90 Charolais × Hereford-Friesian calves were collected at a high temporal resolution at the North Wyke Farm Platform (NWFP) in Devon, UK. These data were then applied to the Intergovernmental Panel on Climate Change (IPCC) modelling framework to estimate on-farm methane emissions under three different pasture management strategies, completing a foreground dataset required to calculate emissions intensity of individual beef cattle.

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Specifications table

Subject area	Agricultural sciences
More specific subject area	Livestock Science

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55	Type of data	Figures
56	How data was acquired	On-farm data collection (liveweight), modelling (methane emissions)
57		
58	Data format	Raw (liveweight), analysed (methane emissions)
59	Experimental factors	Ninety (90) Charolais × Hereford-Friesian cattle randomly allocated across treatments
60		
61	Experimental features	Farm-scale grazing trial with three different pasture management strategies
62		
63	Data source location	Okehampton, Devon, UK (50°46'10"N, 3°54'05"W)
64		
65	Data accessibility	Within this article
66	Related research article	G.A. McAuliffe, T. Takahashi, R.J. Orr, P. Harris, M.R.F. Lee, Distributions of emissions intensity for individual beef cattle reared on pasture-based production systems, <i>J. Clean. Prod.</i> 171 (2018) 1672–1680.
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68		

Value of the data

- Data were obtained from a farm-scale grazing trial, providing insight into economic-environmental trade-offs associated with livestock production systems on commercial farms.
- Adherence to the Intergovernmental Panel on Climate Change (IPCC) modelling framework enables international comparisons of on-farm greenhouse gas emissions.
- The resultant high-resolution dataset can be used to study the temporal variability of economic and environmental performance for individual cattle reared on pasture.

1. Data

With increasing concern about environmental burdens originating from livestock production, the importance of farming system evaluation has never been greater. The data presented here were collected from the North Wyke Farm Platform (NWFP), a farm-scale grazing trial in Devon, UK, in order to study economic-environmental trade-offs associated with cattle rearing under conditions relevant to commercial production. These include: temporal variations in average daily gains (ADG) (Fig. 1), temporal variations in methane emissions from enteric fermentation (Fig. 2), and temporal variations in methane emissions from manure management (Fig. 3). All data are available as [Supplementary materials](#). Using the method of life cycle assessment (LCA), they were subsequently utilised as foreground data to calculate emissions intensity for individual cattle on the NWFP (McAuliffe et al. [1]).

2. Experimental design, materials, and methods

The NWFP is located in Devon, a southwest county of England, UK (50°46'10"N, 3°54'05"W) and consists of three hydrologically isolated small-scale (21 ha) livestock farms known as "farmlets". Each of the three farmlets operates under a different pasture management system, with swards of: (1) permanent pasture, (2) white clover (*Trifolium repens*)/high sugar perennial ryegrass (*Lolium perenne*) mix, and (3) high sugar perennial ryegrass monoculture. Orr et al. [2] provide further information on the NWFP's design concept and farming operation.

Every autumn, 30 Charolais × Hereford-Friesian calves enter each farmlet at the point of weaning. At this time, animals are blocked between sexes and then randomly allocated to the farmlets from an adjacent but separate cow-calf operation, of which grasslands are permanent pasture similar to the

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