Recording methane and feed intake internationally

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Sheep producing countries have been measuring methane and feed intake on their national populations for the development of breeding values. There is interest to combine data from across countries into an international evaluation, but that requires the alignment of protocols, to ensure the same trait was measured. As part of the Brian Wickham Young Person Exchange Program (BWYPEX), Michael Aldridge visited: Australia, New Zealand, Uruguay, the United Kingdom, Republic of Ireland, Norway, and France. The objective of this paper was to identify differences and provide recommendations for aligning protocols.

Methane phenotyping of sheep is well standardised across countries, with the use of portable accumulation chambers (PACs), with minor methodological changes due to local management practices. PACs are manufactured locally using Perspex or built by AgResearch with stainless steel and integrated into purpose-built trailers or modified trucks. The main differences between methane protocols include: 1) the feed on offer before measuring, 2) the off-feed duration before recording, either a strict 1 hour or 1 to 4 hours, 3) the selection of animals in runs, either random or designed groups, 4) the number of animals in a run and the number of animals measured during a farm visit, 5) the measurement duration inside of PACs, 6) actions at various gas concentration thresholds, and 7) the air measurement device used. Feed intake measuring in sheep is less standardised. While commercial units are the most common method, they are all purpose built for research sites. Trial periods range between 6 to 10 weeks depending on adaption periods and ethics requirements. The main differences between feed intake protocols include: 1) which animals are selected for trials, 2) indoor or outdoor housing, 3) number of animals within a trial, 4) feed type used in the trial, 5) method and frequency for measuring daily weight gain, and 6) how potentially spurious records are processed.

The differences in methane phenotyping can likely be overcome with additional data processing or corrected for with fixed effects in linear mixed models. While it may not be possible to standardise the methodology of feed intake trials, it is paramount to report any design differences in any future database. Importantly, the countries currently or planning to measure feed intake need to share knowledge and develop guidelines on how to process individual feed intake measurements.