

TECHNIQUES:**Using the alkane technique to quantify sheep selectivity when grazing perennial and annual pastures**

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As a result of drought, overgrazing and low fertiliser inputs, many perennial pastures in the high rainfall zones have degraded to a state where they are dominated by annual species. Research is being conducted at the Big Ridge site at Chiswick, CSIRO, under the Key Program on Temperate Pasture Sustainability, to understand how climate, soil, plant and animal factors contribute to the sustainability of pastures dominated by perennials and annuals.

The impact of animal grazing selectivity on pasture sustainability can be quantified by measurement of alkanes (leaf waxes) in the plant species on offer and in the dung. This paper reports the results of preliminary experiments to assess this technique:

- for estimation of daily faecal output, and thus feed intake; and,
- to compare the alkane patterns of different pastures and test how accurately the proportion of pasture species in a mixed pasture can be identified.

Results***Use of dosed alkane capsules for estimating daily faecal output and feed intake***

One method for estimating herbage intake of grazing sheep is to dose the sheep with capsules which release chromium oxide into the gut at a known daily rate. Measurement of the concentration of chromium in the faeces allows calculation of total faecal output and estimation of feed intake as:

$$\text{intake} = \text{faecal output} / (1 - \text{digestibility}).$$

Sheep were dosed with either capsules which released chromium oxide at 193 mg/day or two alkanes (C32 + C36) at 48.2 mg/day. There was no significant difference in using the alkane or the chromium oxide capsules for estimating sheep daily faecal output.

Use of alkane signatures for separation of species in mixed pasture samples

The alkane patterns of pasture species must differ for accurate estimation of diet composition. More complex mixtures of species requires more detail on the alkanes of each species. Samples of 12 species were collected from the Big Ridge site and analysed for alkanes. There appear to be sufficient differences between grasses and legumes to separate into broad groups, however, as yet, not into individual species.

Prepared mixtures of phalaris and white clover have been separated into their component proportions with an accuracy of approximately 1%. Further experiments are being conducted to assess the accuracy with which four or more species can be separated from a mixed sample and how the alkane contents of pasture species vary between samples collected from adjacent sites and between samples collected at different times.

Conclusion

The alkane technique appears to be a useful tool for assessing the impact of grazing pressure and selectivity on pasture sustainability.