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USE OF FAECAL NEAR INFRARED REFLECTANCE SPECTROSCOPY ON RANGELANDS OF THE GREAT DIVIDING RANGE

K.J. Sibson and B. Alchin

University of Queensland, Gatton Qld 4343

BACKGROUND

Beef cattle production has been carried out on the basalt soils – Queensland bluegrass (*Dicanthium sericeum*) areas of the Great Dividing Range in south-east Queensland for over 100 years. However, the native pastures in these areas often do not meet the nutritional requirements of the animals, particularly during the usually dry period through late Autumn-Winter-early Spring.

The relatively new technology of Faecal Near Infrared Reflectance Spectroscopy (FNIRS) was developed to predict various dietary attributes (Coates 2000). The analysis technique is rapid and single samples determine a wide range of attributes, including dietary and faecal nitrogen, dietary digestibility, grass component of the diet and average daily weight gain.

The purpose of this study was two-fold: (1) to investigate the nutritional profile of cattle grazing on native pastures in the late Winter-early Spring, and (2) to assess the efficacy of the standard FNIRS sampling technique.

METHODOLOGY

Pasture and faecal samples were taken from an open grassed paddock on the colluvial slopes on "Glen Rock", 60 km south of Gatton in SE Qld. The 300 ha paddock carried 100 Brahman-cross steers and represented typical grazing pressure for the region.

The pasture and faecal material were sampled on a weekly basis between August and October, 2003. Each faecal sample set consisted of ten separate faecal samples, which were bulked and sub-sampled in the paddock. On two separate occasions, twenty individual faecal samples were taken and analysed to determine their variation using the FNIRS sampling technique.

On each sampling date, five replicates were taken of all the pasture to 2 cm above ground level within a 1 sq m quadrat. Individual species within each sample were separated. The two most dominant pasture species, Queensland bluegrass and wiregrass (*Aristida* spp.) were analysed for nitrogen.

RESULTS AND DISCUSSION

Nutritional profile of cattle

A summary of some of the data is in Table 1. There was a general decline in crude protein from August to October. However, a significant rainfall event in late September resulted in growth of annual forbs and this produced an increase in dietary crude protein (CP).

The efficacy of FNIRS for faecal nitrogen analysis

The correlation between faecal nitrogen as determined by FNIRS and from standard auto analysis was relatively high (R^2=0.82). No NIRS value departed more than 0.35% from the regression line. This indicated its use for this purpose in the rangelands of the Great Dividing Range is appropriate.

Table 1. FNIRS data for Queensland bluegrass pastures on the Great Dividing Range in SE Qld.

Date	Qld Bluegr. Nitrogen (%)	Wire grass Nitrogen (%)	Dietary CP (%)	Faecal Nitrogen (%)	Digestib. (%)
5-Aug	0.34	0.52	5.4	1.06	46.4
15-Aug	0.36	0.45	5.5	1.11	46.6
27-Aug	0.36	0.44	5.2	1.06	47.2
5-Sep	0.41	0.44	4.8	0.97	46.4
12-Sep	0.36	0.45	5.2	1.01	45.7
20-Sep	0.32	0.41	5.0	0.96	45.7
25-Sep	0.30	0.41	5.1	1.02	46.3
12-Oct	0.35	0.40	6.6	1.19	47.2

RECOMMENDATIONS

The results indicate that a response to nitrogen would be expected in the dry season in the Great Dividing Range of SE Qld. It is recommended that a protein supplement be supplied to increase both protein and forage intake because of the lack of crude protein content for both maintenance and growth of cattle in the late Autumn-early Spring period. It is also recommended that, to maintain consistent growth in that period, an energy supplement (eg. molasses) be used.

The FNIRS sampling technique displayed minimal variation between the individual samples for the majority of attributes measured, indicating the current sampling technique of ten samples is sufficient to represent the sampled population.

REFERENCES

Coates, D.B. (2000). Faecal NIRS – what does it offer today's grazier? *Tropical Grasslands* 34: 230-239.