DUODENAL PROTEIN SUPPLY IN CATTLE GRAZING SIGNAL GRASS *(BRACHIARIA DECUMBENS)* AND GLENN JOINT VETCH *(AESCHYNOMENE AMERICANA)*

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The quantity of protein absorbed from the small intestine is 1 of the major determinants of growth rate and is a function of intake, the protein content of the diet and the N transactions that occur within the rumen. With temperate forages quite extensive loss of protein can occur (up to 40%) in the net transfer of ingested protein to the duodenum (Cruickshank *et al.* 1985; Ulyatt *et al.* 1988). No information appears available for tropical pastures and this study reports the values obtained for signal grass (SG) and glenn joint vetch (V).

Four Santa Gertrudis x Hereford steers (179 ± 6.0 kg) fistulated at the rumen and duodenum grazed SG or V and were infused continuously with $YbCl_3.6H_2O$ and CrEDTA via a portable infusion pump for 6 days. Over the last 2 days digesta and faeces were sampled at 8-h intervals, staggered such that the bulked sample represented a sample every 4 h. Digesta flow was processed and calculated as described in Cruickshank *et al.* (1985). Four oesophageally fistulated steers were used to obtain representative samples of the diet selected. The herbage mass and green leaf herbage mass on offer were 4040 and 1030 kg DM/ha for SG and 20700 and 3670 kg DM/ha for V respectively.

The cellulase *in vitro* organic matter digestibility of the oesophageal extrusa was 0.58 ± 0.004 and 0.64 ± 0.011 for SG and V respectively. There was no significant difference in OMI between V and SG although N intake was significantly higher for V ($P<0.01$, Table 1) as a result of the higher N content of V (35.6 v. 16.6 g/kg OM). However, there was a significant loss (43%) of vetch protein N in net transfer to the small intestine as NAN whilst there was a small gain (6%) for SG (Table 1). These results were reflected in the higher rumen NH_3 levels of V (307 ± 33.1 v. 68 ± 7.5 mg NH,-N/L $P<0.001$). There was little difference between the grass and legume in the duodenal flow of NAN/kg DOM (Table 1), a measure of the protein/energy ratio of absorbed nutrients.

Table 1. The organic matter intake (OMI, g/kg LW.day), nitrogen intake (NI, g/kg LW.day), duodenal non-ammonia N flow (g NAN/kg LW.day) and the duodenal NAN/kg digestible organic matter (g NAN/kg DOM) of signal grass (SG) and glenn joint vetch (V) grazed by steers

	OMI (g/kg LW.day)	NI (g/kg LW.day)	NAN flow (g/kg LW.day)	NAN/DOM (g/kg LW.day)
SG	28.2 ± 2.45	0.47 ± 0.04	0.49 ± 0.05	30.0 ± 2.36
V	22.1 ± 1.23	0.79 ± 0.04	0.45 ± 0.01	31.7 ± 1.41

These results demonstrate for the first time that significant losses of protein in a tropical legume pasture can occur in grazing cattle whilst little loss is observed for a tropical grass. Cruickshank *et al.* (1985) and Ulyatt *et al.* (1988) have calculated for temperate pastures that losses will occur in the net transfer of protein to the intestines when dietary crude protein exceeds about 210 g/kg DOM. The values for V and SG are 349 and 180 respectively and indicate that a similar value might apply for tropical pastures. In support of this, lucerne has a value of 437 g/kg DOM and loses 39% in the net transfer of its protein in lambs, values similar to V. Legumes are added in pastures to increase the protein supply to the animal, but this study demonstrates that extensive loss of protein can occur and this characteristic may be one to consider in any genetic manipulation of tropical legumes.

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