# Seasonal changes in the degradability of protein in a tropical grass pasture

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Metabolizable protein (MP) represents the true protein absorbed in the intestines, and includes that supplied as microbial protein as well as undegraded dietary protein (UDP). Microbial protein production is in turn dependent on the availability in the rumen of energy substrates and degradable protein (rumen degradable protein; RDP). Thus MP supply is determined by both the total intake of protein and its degradability in the rumen. However, in relation to grazing animals, a major deficiency is knowledge of the degradability of the protein in the pasture, especially with tropical pastures. The current study provided estimates of the degradability of protein in the diet of animals grazing tropical pasture in northern Australia.

The pasture was predominantly buffel grass *(Cenchrus ciliaris)* with minor contributions from other grasses and from Seca sty10 *(Stylosanthes scabra cv.* Seca; <9% of total yield), growing in the brigalow region of central Queensland. Samples of the diet (extrusa) were collected using oesophageal–fistulated steers across five similar paddocks (2-3 steers/paddock) every 6–8 weeks between October 1994 and August 1996. Samples of extrusa were bulked across animals, freeze dried and ground to 3 mm. The proportion of UDP (escape protein) in the extrusa was estimated using the ***in sacco*** technique of Mass ***et al.*** (1997). This method determines the rate of disappearance of neutral detergent insoluble nitrogen, assumed to be the potential rumen undegradable fraction, and applies an assumed rumen outflow rate (here 0.02/h).

In Figure 1, the crude protein (CP) content of the diet, and its component RDP and UDP, are shown. CP content of the diet followed seasonal trends, peaking soon after the start of the summer storms and declining to less than 6% of DM in the dry winter/spring period in both years. Heavy unseasonal rainfall in May 1996 precipitated a sharp rise in CP content. RDP represented more than 75% of the CP in the diet throughout the sampling period, with highest proportional contributions in the early wet season and in May 1996 when pasture was green and lush (96%). Based on a requirement for RDP of 130 g/kg digestible organic matter (DOM; see Klopfenstein 1996) to ensure microbial growth is not limited by nitrogen supply, RDP was just adequate for most of the wet season but limiting during the drier months. Thus supplementation strategies aimed at increasing microbial protein production through supplying more fermentable OM may not show expected responses in the field because RDP becomes limiting, especially with tropical pastures.

The financial support of the Meat Research Corporation is acknowledged.

## References

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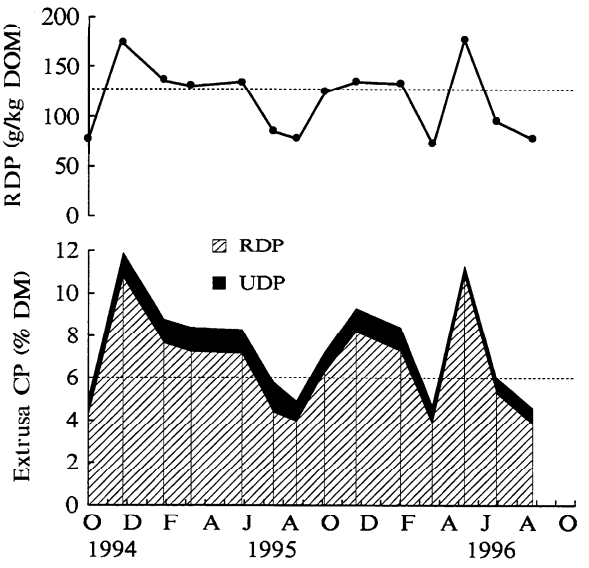


**Figure 1** Seasonal changes in estimated content of rumen degradable protein (RDP), undegraded dietary protein (UDP) and of total crude protein (CP; = RDP + UDP) in the diet of steers grazing a tropical grass pasture in central Queensland. Dotted lines indicate 6% CP and 130 g RDP/kg DOM.