EFFECT OF HERBAGE INTAKE ON DAILY ABOMASAL FLOWS OF DIGESTA AND MICROBIAL PROTEIN IN THE GRAZING EWE

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The synthesis of microbial protein in the rumen provides the grazing ruminant with its main source of protein. Despite the importance of this process, there are few estimates of digesta flow and microbial protein production in the grazing animal, or of the way in which these change as the animal passes through the various stages of the breeding cycle.

We measured these variates in 15 Border Leicester x Scottish Blackface ewes, which were fistulated at the rumen and abomasum and which grazed perennial ryegrass pastures. Herbage intake was determined as described by Dove et al. (1990). Estimates of the daily flow of abomasal digesta and of microbial protein were made using continuous intra-ruminal infusions of ruthenium phenanthroline complex/CrEDTA and of $^{35}Na_2SO_4$ respectively, as described by Dove et al. (1988). Measurements were made when the ewes were at days 15, 30, 43 and 93 of lactation. The lambs were weaned on day 100 and measurements were then repeated 30 days later.

The available herbage rose from approximately 750 kg OM/ha on day 15 to 1400 kg OM/ha on day 43, and then rose rapidly to remain above 2000 kg OM/ha for the rest of the study. Herbage intakes rose to day 43, then declined. The mean herbage intake was 1644 g DM/d (±144.5) and the mean flow of abomasal digesta 791 g DM/d (±69.3). The respective mean daily flows of non-ammonia nitrogen (NAN) and microbial N were 31.7 g (±3.39) and 23.2 g (±3.69). The Table shows regressions relating DM intake, DM flow and microbial N flow.

Dependent variate	Independent variate	Coefficient	Intercept	
DM flow	DM intake	0.425	92.5	r^2=0.786,P<0.001
Microbial N	DM intake	0.020	-7.26	r^2=0.737,P<0.001
Microbial N	NAN flow	0.913	-2.76	r^2=0.962,P<0.001

Daily abomasal DM flow was closely related to DM intake, with no apparent differences between measurements at different stages. Based on this equation and the known herbage digestibilities, we calculated that 0.641 of the digestible DM apparently disappeared across the rumen. Similarly, from this equation and the significant relationship between microbial N flow and DM intake, we calculated that the production of microbial N was 30.4 g/kg DM apparently disappearing across the rumen. The regression coefficient of the third equation in the Table indicates that, in these grazing animals, the bulk of the NAN flow was of microbial origin. This in turn indicates that the protein of freshly grazed perennial ryegrass is extensively degraded in the rumen.

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