

THE FLOW OF PROTOZOAL NITROGEN TO THE OMASUM OF CATTLE

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Ciliate protozoa may constitute more than 50% of the rumen microbial biomass (Jouany et al. 1982). There is evidence indicating some degree of sequestration of protozoa in the rumen (Weller and Pilgrim 1974; Harrison et al. 1979). However, there have been few measurements of the contribution of protozoa to the protein flowing from the rumen. This paper reports measurements of the flow of protozoal nitrogen (N) to the omasum of steers given kikuyu grass hay (*Pennisetum clandestinum*) at three levels of intake.

The hay, sprayed with the markers Cr-EDTA and Yb NO₃, was given to six rumen-fistulated steers (300 kg live weight) at 3-h intervals. Flows of digesta and its components were measured by reference to marker concentrations in samples collected from the omasal canal by means of a tube passed into the omasum via the rumen. Microbial N was determined from the incorporation of ¹⁵N after an intraruminal infusion of (¹⁵NH₄)₂SO₄ and protozoal N by a micro-Kjeldahl method after sedimentation of protozoa from a known volume of fluid obtained by straining omasal digesta.

TABLE 1 Feed intakes and flows of protozoal and microbial N (g/d) to the omasum of steers fed kikuyu hay

Feed intake	Low	Medium	High†	SE of means
Organic matter intake	2780	3570	4380	19.00
N intake	29.0	37.2	46.0	0.414
Total N flow to omasum	35.5	46.3	59.7	2.12
Protein N flow to omasum	28.4	37.0	47.8	1.74
Microbial N flow to omasum	20.7	24.1	34.0	2.96
Protozoal N flow to omasum	5.98	6.26	9.95	0.918
Faecal output of N	12.5	17.3	24.5	1.57

† 0.9 x ad libitum.

For the low, medium and high intakes, protozoal N contributed, respectively, 29, 26 and 29% of the total microbial N flow to the omasum. Protozoal N contributed 17-21% of the protein N leaving the rumen. Harrison et al. (1979) calculated by a difference method that protozoa could contribute 21-27% of the total amino acid N reaching the duodenum of sheep while Steinhour et al. (1982), using ¹⁵N, estimated a protozoal contribution of 22-41% of the total non-ammonia N reaching the duodenum of a steer. The results reported here indicate that protozoa contribute significantly to the flow of microbial protein from the rumen.

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