

PRESENCE OF RUMINAL BACTERIA THAT HYDROLYSE TANNIC ACID-PROTEIN COMPLEXES DOES NOT IMPROVE THE LIVELWEIGHT GAIN OF CATTLE GRAZING TAGASASTE

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Streptococcus caprinus is a tannin-resistant bacterium that could improve the performance of ruminants browsing phenolic-rich forages (Brooker *et al.* 1994). Tagasaste is a forage shrub which can contain high levels of phenolics, the concentration of which has been negatively correlated with animal performance (McNeill *et al.* 1994). This study was designed to determine the natural occurrence of *S. caprinus* in domestic cattle browsing tagasaste and its effect on productivity.

Twenty-eight Shorthorn steers were screened for the presence of *S. caprinus* in late April and late September 1994. The steers had been browsing a diet that was predominantly tagasaste for at least 6 months prior to April and continued to browse it throughout the trial. At each screening approximately 100 ml of rumen fluid was collected via rumen tube, mixed with 30 ml of glycerol, and snap frozen in liquid nitrogen. Under anaerobic conditions, the samples were later thawed, diluted, and plated out on to nutrient agar plates containing 0.5 % (w/v) tannic acid (Brooker *et al.* 1994). Colonies that were shiny white and produced large zones of clearing around them, regularly verified microscopically as cocci bacterium often occurring as diplococci or short chains, were counted as *S. caprinus* colonies. This identification procedure, although not definitive was considered adequate since extensive screening of rumen fluid from a wide range of wild and domestic ruminants has not identified any bacterium other than *S. caprinus* capable of producing clearing zones on 0.5% w/v (or greater) tannic acid plates. Steer liveweight gains were measured fortnightly. After the September screening the steers were classified into *S. caprinus* "status" groups (Table 1). Mean liveweight gains for each status group were compared by ANOVA at the dry time of the year (April/May), when liveweight gains are low and phenolic levels in the tagasaste are high, and again in the wet time of the year (August/September), when liveweight gains are high and phenolic levels are low, as well as overall. Colony counts were compared after log transformation.

All status groups had similar patterns of liveweight gain at both the dry and wet times of the year (Table 1). A substantial proportion of the steers (9/28) stayed positive for *S. caprinus* over the 4 months of the trial, and the concentration of *S. caprinus* in their rumen fluid did not change significantly over this period (mean for both collections = $4.08 \pm \text{SD of } 0.70 \text{ log cfu/mL}$). Of the 18 steers that were initially negative, nine naturally acquired the bacterium by September.

Table 1. The performance of steers differing in status for *S. caprinus*

Status for <i>S. caprinus</i>	n	Mean initial liveweight (kg)	Mean liveweight gain (kg/day)		
			Dry season	Wet season	April to Sept
++	9	180	0.02	1.37	0.66
+-	9	184	0.12	1.35	0.68
--	9	183	0.03	1.38	0.61
+-	1	200	0.05	1.31	0.51
Pooled SD		17.6	0.19	0.19	0.11

++ = positive for *S. caprinus* in April and September, +- = changed from negative to positive, -- = stayed negative, and +- = changed from positive to negative.

The results indicate that the presence of *S. caprinus* or other bacteria that hydrolyse tannic acid-protein complexes on growth plates may not improve liveweight gains in either the dry season, when phenolic concentrations in tagasaste are high, or in the wet season, when phenolic concentrations are relatively low. Further studies are required to definitively determine that all the microorganisms that produced clearing zones were *S. caprinus*.

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