

Rumen distension and contraction influence feed preference by sheep

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Abstract :

Distension of the rumen limits feed intake by livestock. Ruminaldysfunctions due to bloat, which causes distension by accumulationof excessive gas within the rumen, also reduce feeding. We hypothesizedthat excessive levels of rumen distension cause feed aversionsand that preference increases for feeds eaten in associationwith recovery from bloat. To test these hypotheses, we determinedwhether 12 commercial crossbred lambs (average initial BW of 43 ± 2 kg) could associate ingestion of specific feeds with the consequences of increased intraruminal pressure and its subsidence. Six of the lambs were fitted with rumen cannulasand offered ground alfalfa for 30 min after a rubber balloonwas inserted into the rumen of each animal and distended with air to volumes of 1.8, 2.5, or 4.5 L. Subsequently, balloons were deflated and alfalfa was offered again for a second period of 30 min. Feed intake was not affected when the balloon was not distended ($P = 0.45$ to 0.93), but distension reduced feed intake ($P < 0.001$) in direct proportion to the magnitude of distension at all 3 volumes ($R^2 = 0.70$). Relief from distension promoted a compensatory increase in feed intake ($P = 0.006$). During conditioning to determine if lambs acquired a preference for a feed associated with recovery from distension, fistulated lambs were offered novel feeds: wheat bran (group 1; $n = 3$) and beet pulp (group 2; $n = 3$), and the balloon was distended for 30 min. Feeds were then switched and the balloons were deflated (recovery). Control lambs ($n = 6$) received the same feeding protocol without the balloons. Lambs formed strong aversions to feeds associated with distension and preferred feeds associated with recovery ($P = 0.001$ to $P = 0.10$). No preferences or avoidances were observed in control lambs conditioned without rumen distension ($P = 0.17$ to $P = 0.87$). Thus, rumen distension and recovery from distension induced feed aversions and preferences, respectively, which may be critical in learning avoidance of bloat-inducing plants and preferences for plants and supplements that relieve the incidence of bloat.

Key Word :

bloat, diet selection, foraging, learning, sheep

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