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Leafy spurge interactions with cattle, sheep and goats

S. L. KRONBERG and J. W. WALKER

USDA-ARS, Sheep Experiment Station, Dubois, ID 83423

We are attempting to determine why cattle generally avoid leafy spurge and why goats appear to graze it more readily than sheep in southeast Idaho. In contrast to goats, cattle and sheep are more likely to develop an aversive response to leafy spurge the first time that leafy spurge enters their rumen. Blood cortisol levels are elevated in sheep when spurge is first placed in their rumen. This suggests that sheep experience physiological stress with their first ruminal exposure to leafy spurge. However, when sheep are pre-exposed to leafy spurge (i.e., when leafy spurge is placed in their rumen on several days before a test for aversion) they do not exhibit an aversive response from leafy spurge at a later time. In conjunction, blood cortisol levels don't tend to elevate at a later leafy spurge exposure when sheep are pre-exposed to leafy spurge. These findings may partially explain why sheep seem to require an adjustment period before they will begin grazing significant amounts of leafy spurge.

After leafy spurge is fermented for 12 hours with either goat or sheep ruminal digesta, the mixture of sheep digesta and leafy spurge elicits a greater aversive response from sheep than the fermented mixture of goat digesta and spurge. This finding suggests that ruminal activity in goats degrades an aversive compound in leafy spurge to a greater degree than ruminal activity in sheep. Alternatively, sheep may produce an aversive compound from leafy spurge in their rumen; whereas, goats do not. Unfortunately, when we transferred ruminal digesta (with its compliment of microbes) from goats into cattle, these cattle experienced the same aversive response to leafy spurge as did cattle that did not receive goat digesta.

Finally, in an attempt to identify an aversive compound in leafy spurge, we injected a diterpene that has been found in leafy spurge (Ingenol 3,20-Dibenzoate) into the jugular blood of sheep and found that it did not elicit an aversive response from sheep.