

CHANGES IN BACTERIAL DIVERSITY IN THE RUMEN OF SHEEP CONSUMING *JUNIPERUS MONOSPERMA*

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Shrub encroachment and subsequent loss of grasslands is a serious problem for livestock producers in the southwestern United States. One of the main shrub species of greatest concern is *Juniperus monosperma* (JM). A proposed method for reduction of JM encroachment is to allow small ruminants to intensively graze JM infested areas. Juniper shrubs contain secondary compounds classified primarily as terpenes that are antimicrobial in nature and may be detrimental to microbial populations present in the rumen. A reduction in the viability of the rumen microbial population could result in decreased feed digestibility and compromised animal health. A study was designed using five rumen cannulated crossbred wethers (average body weight 55 kg \pm 15) in a cross-over design divided into two 20-d periods to determine the effect of JM consumption on the diversity of ruminal bacteria. Juniper leaves were harvested and frozen immediately until fed. Sheep were gradually adapted to a diet of 25% JM leaves and 75% buffalo grass hay over a 10-d period (adaptation). Sheep were fed twice daily and unconsumed feed was placed directly into the rumen via the rumen cannula to ensure equal JM intake across treated animals. Rumen samples were collected every 2-d for the duration of diet adaptation and experimental phases of the study (12 total; 6 per phase). DNA was extracted from ruminal samples for denaturing gradient gel electrophoresis (DGGE) analysis. This analysis allows us to monitor changes in the rumen microbial population without culturing the bacteria. Resulting DGGE profiles were used to calculate diversity indices. A baseline sample was collected prior to the adaptation phase and the difference from baseline for each animal during adaptation and experimental phases was used to determine the effect of treatment. All animals increased in bacterial diversity ($P < 0.05$) during the adaptation phase compared to baseline. Treatment did not affect banding richness or Shannon-Weiner index during adaptation or experimental phases. These data indicate that gradual introduction of JM into diets of small ruminants may allow for adaptation to secondary metabolites present in JM by ruminal bacteria.

ASSESSING THE NUTRITIVE VALUE OF ONE-SEED JUNIPER IN SHEEP

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One-seed juniper (*Juniperus monosperma*) encroachment on rangelands is a problem in the Southwest. A proposed method of juniper control is consumption by small ruminants, such as sheep and goats. The objective of this study was to evaluate effects of feeding

juniper as a forage as an addition to a low quality diet. Five ruminally cannulated wethers (Body weight 121 ± 33 lbs.) were used in two cross-over experiments composed of two 20-day periods to estimate nutritive value of juniper as a forage. In Exp.1, sheep were fed either 100% buffalo grass straw (*Buchloe dactyloides*; 93% DM, 76.5% NDF, 4.5% CP (DM basis)) or a mixed diet of 75% buffalo grass straw and 25% juniper; juniper contained 73% DM, 71.7% NDF, 6.0% CP (DM basis)) at 2% of body weight. In Exp. 2, either soybean meal (SBM) or fish meal (FM) was added to the mixed diet to achieve 12% CP. Protein sources of differing rumen degradabilities were fed to determine the potential for associative effects. Associative effects can be either negative or positive; negative effects result in decreased digestibility of the basal diet, whereas positive associative effects would result in an increased digestibility of the basal diet. Soybean meal will be mostly rumen degradable, whereas fish meal will pass through the rumen mostly undegraded and be digested in the stomach and small intestine. Sheep were gradually adapted to a diet over a 10-day period fed at 2% of body weight. Feed refusals were weighed and then placed directly into the rumen via rumen cannulae. Total feces and urine were collected and subsampled on day 6-10 of each period. Rumen evacuations were conducted on day 10 of each period. Dry matter and NDF were determined for composited fecal and rumen samples for each sheep fed each treatment combination. Rumen NDF and DM fill were similar ($P > 0.05$) among sheep and diets; sheep had similar diet digestibilities ($P > 0.05$). The mixed diet showed higher ($P < 0.05$) DM and NDF digestibility compared to the 100% buffalo grass straw diet (mixed diet: 56.2, 65.9% \pm 1.8; buffalo grass straw: 47.7, 54.4 \pm 1.5, for DM and NDF digestibility, respectively). The addition of SBM or FM to the mixed diet had no influence ($P \geq 0.15$) on DM or NDF digestibility (SBM: 49.1, 50.9 \pm 1.8; FM: 57.4, 61.3% \pm 1.4 for DM and NDF digestibility, respectively). Based on these data, if ruminant animals were to consume juniper along with dormant range grasses, total diet digestibility may be increased, and juniper may be a viable feed source when browsed with poor quality range forage.

Keywords: *Juniperus monosperma*, Juniper, Digestibility

EFFECTS OF METHIONINE SUPPLEMENTATION ON PERFORMANCE OF STRESSED ANGUS-CROSS STEERS

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Key Words: Methionine, Stress, Steers

Introduction: Economic losses associated with newly received feedlot cattle represent a significant expense to cattle producers. These losses often occur as a result of stress associated with handling, transportation, and exposure to infectious agents. Bacterial infection has been associated with a number of diseases in animal production