One seed juniper intake by sheep and goats supplemented with degradable or by-pass protein

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Suppression of one-seed juniper (*Juniperus monosperma* Englem. Sarg.) re-invasion into previously cleared woodlands is an increasingly challenging endeavor for New Mexico ranchers. Prescribed burn regulations are becoming more stringent, herbicide application is often costly, and demands by the general public to conduct management perceived as being environment-friendly are increasing rapidly. Prescribed grazing with sheep and goats is an alternative suppression method that could be used within the land management constraints described above. A successful prescribed grazing plan, however, may depend on identifying times of the year when juniper terpenoid levels are less likely to deter herbivory and may be contingent on the use of supplements to help animals detoxify terpenes and boost intake. We conducted a pen experiment with sheep and goats to determine if individual juniper intake varied seasonally (summer, fall or winter) or was affected by the amount and kind of crude protein (CP) in the diet. Twelve Ramboullet ewes and 12 Spanish-Boer goats were offered a basal diet of sudangrass hay with either no protein added (Control diet: 5% CP), or with soybean meal (degradable CP: DCP) or fishmeal (by-pass CP: BPCP) to achieve two treatment diets with 12.5 % CP each. Diets were offered at 1.6% of body weight (BW) to each animal for 10 days during each season. Overnight fasting (10 h) was applied prior to juniper browsing trials that were conducted during the morning hours. Juniper trials consisted of a 30 min feeding bout on juniper branches (175g) attached to wooden stands (0.8 m height). Juniper intake (± 1 g) was calculated as the difference between pre- and post- trial juniper biomass corrected by the water loss of 5 control juniper stands. Juniper intake per unit of BW (JI) varied among herbivore species and was greater for goats than sheep (Goats: 0.54g $kgBW^{-1}$ vs. Sheep: 0.23g $kgBW^{-1}$). JI varied among diets and was highest for animals receiving the DCP (0.5g $kgBW^{-1}$) and BPCP (0.41g $kgBW^{-1}$) supplements and lowest for control animals (0.25g $kgBW^{-1}$). JI also varied among seasons and was highest in winter (0.54g $kgBW^{-1}$), intermediate in summer (0.38g $kgBW^{-1}$) and lowest during the fall (0.23g $kgBW^{-1}$). Sheep and, especially, goats could be used in prescribed grazing programs to suppress juniper re-invasion. Greater suppression could be expected from goats browsing during winter, provided that protein levels are sufficient to allow animals to detoxify terpenoids.

Key words: juniper control, goats, sheep, supplements.