

## RANGELANDS

### TARGETED GRAZING WITH SMALL RUMINANTS TO CONTROL ENCROACHMENT OF ONE-SEED JUNIPER SAPPLINGS

**AUTHORS:** Santiago A. Utsumi, Andres F. Cibils, Richard E. Estell, John W. Walker, and Shad H. Cox

**THE STORY IN BRIEF:** We determined whether targeted grazing with small ruminants could be used to suppress one seed juniper sapling growth. Since most domestic ruminants avoid feeding on juniper, our study focused on finding ways to boost shrub browsing intensity to levels that would eventually either kill or severely cripple sapling growth without permanently degrading the grass understory. We specifically tested the efficacy of manipulating stocking density and mixing ruminants with different feeding habits (goats + sheep) in summer or spring. Mixed grazing with sheep and goats at high stocking densities (about 11 sq. ft allotted to an animal for one day), resulted in highest sapling use. Animals tended to strip needles and thin stems from young saplings (approximately 2 ft tall) whereas impacts on older saplings (more than 3 ft tall) were mostly associated with severe bark stripping. Fecal analyses indicated that juniper accounted for 25% of animal diets on average. There was a great deal of variation in dietary composition among animals (juniper accounted for up to 60% of some animal diets) and in levels of browsing of neighboring saplings. On-going vegetation monitoring efforts will determine rates of juniper sapling kill, changes in architecture and growth regime of browsed saplings, and grass understory recovery.

**THE PROBLEM:** Controlling encroachment of undesired woody plants on rangelands often requires using a number of complementary vegetation management tools (fire, mechanical removal, chemical removal, biological control). Although targeted grazing with goats and sheep has the potential to extend the life of traditional woodland thinning treatments, its efficacy has not been tested.

**OBJECTIVE:** To determine the feasibility of using targeted grazing with sheep and goats as a means of suppressing one seed juniper sapling growth and encroachment.

**EXPECTED OUTCOMES:** We expect to quantify the rate of one seed juniper sapling kill, changes in juniper sapling architecture, and alterations in understory grass cover that occurred as a result of applying specific stocking density treatments of either goats alone or of goats + sheep in summer and spring.

**DURATION:** 2005 – 2008 (These data are preliminary)

**APPROACH:** We used a 2x2 factorial design which consisted of applying targeted grazing with two herbivores and two stocking densities during summer or spring at the NMSU, Corona Range and Livestock Research Center. Ten adult dry does (Goats alone) or five does mixed with four adult dry Western White Face ewes (Mixed grazing) were placed in 10x10 m plots for one day (High Density) or 20x30 m plots for six days (Low

Density). Stocking rate in both treatments was 8.15 acres/AU/yr. There were two complete blocks in each season. Time spent feeding on juniper (TFJ; %) and utilization of herbaceous vegetation (UHV; %) and juniper saplings (UJS; %) were determined.

**RESULTS:** There were no differences in time spent feeding juniper saplings (TFJ) or in levels of utilization of herbaceous understory (UHV) between seasons. Goats spent more time feeding on juniper in high vs. low stocking density treatments, although differences in TFJ among stocking density treatments were larger in mixed grazing plots (34.4 vs. 17.7% ± 3.5) than in plots where goats grazed alone (28.2 vs. 22.2% ± 3.6). UHV was higher in low vs. high stocking density plots (67.0 vs. 59.6% ± 2.3) and in plots with mixed grazing vs. grazing by goats alone (69.8 vs. 56.9% ± 2.4). Mixed high density grazing resulted in lowest number of tall saplings (> 1m) exhibiting low utilization (< 33% branches defoliated), the greatest percent of small saplings (< 0.5m) receiving heavy utilization (> 66% branches defoliated), and lowest percent of saplings with low bark stripping (< 33% branches stripped) in spring.

**POTENTIAL APPLICATION:** Our results suggest that high stocking density and mixed grazing with sheep can boost utilization of juniper saplings by goats while preserving the grass understory.

**EDUCATIONAL PLAN:** A detailed account of the results of this study will be submitted for publication in a peer-reviewed rangeland management journal. Our final article will be posted on the Corona Range and Livestock Research Center’s web site (<http://corona.nmsu.edu>).

**Table 1:** Summary of grazing-related variables of four targeted grazing prescriptions applied to juniper-infested rangelands at CRLRC. Values followed by different letters indicate statistically significant differences at P=0.05

Description	Targeted grazing treatments				
	Control	Low stocking density		High stocking density	
		Mixed	Goats	Mixed	Goats
<b>Grazing-related variables</b>					
Stocking rate	No grazing	----- 0.3 ha AU/yr -----			
Stocking density	No grazing	10 m <sup>2</sup> AU/day		60 m <sup>2</sup> AU/day	
Plot size	30 x 20 m	30 x 20 m		6 x (10 x 10 m)	
Juniper in goat diets, %	No grazing	27.0 ± 6.9	24.4 ± 6.3	33.5 ± 0.8	27.1 ± 5.6
Herbaceous vegetation use, %	No grazing	73.5 ± 4.9 a	60.9 ± 2.8 b	66.8 ± 0.8 ab	52.1 ± 4.2 c
Juniper saplings use, %	No grazing	38.2 ± 6.3	41.7 ± 2.7	52.3 ± 13.1	39.9 ± 7.0
> 66% use		30.5 ± 6.4	28.6 ± 5.5	32.0 ± 10.6	37.7 ± 7.7
33 – 66% use		31.3 ± 8.1	29.7 ± 3.4	15.7 ± 3.2	22.4 ± 7.7
< 33% use					