Cheatgrass (*Bromus tectorum*) Response To Simulated Grazing

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Introduction

Cheatgrass (*Bromus tectorum*) is an aggressive annual grass that was accidentally introduced into the United States in the mid 1800s. Platt and Jackman (1946) adequately described cheatgrass as "a conquering invader from the Mediterranean that has adopted infiltration tactics that would do credit to a well trailed Asiatic militarist." Cheatgrass has caused enormous problems on rangelands through its' ability to truncate secondary succession as it out competes native perennials for moisture and increases the chance of ignition, as well as the rate and spread of wildfires that lead to severe loss of native plant communities and cheatgrass dominance (**Figure 1**). The efforts to suppress and control cheatgrass have been an ongoing undertaking for more than a half century. Among those efforts are mechanical, herbicide, plant propagation, and grazing (**Figure 2 and 3**). As early as 1942, Fleming, Shipley and Miller pointed out in their publication "*Bronco Grass on Nevada Ranges*" that cheatgrass could respond positively to early grazing. Pratt and Jackman reiterated this again in 1946. We examined the effect of early grazing on 3 separate Nevada cheatgrass populations 1) salt desert shrub, 2) Wyoming big sagebrush (*Artemisia tridentata* ssp. wyomingensis) and 3) mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) communities in an effort to put numbers to Fleming, Shipley and Miller's initial claim.

Figure 1. Cheatgrass invasion on a formerly big sagebrush/bunchgrass community. This sage grouse habitat is in severe danger as the few remaining big sagebrush islands are certain to burn in a cheatgrass fueled wildfire.

Figure 2. Resource managers and Scientists discuss the various options in their efforts to suppress and control cheatgrass. This site in northern Nevada received herbicide, mechanical, and grazing treatments in combination with seeding of competitive perennial grasses.

Methods

Cheatgrass seeds were collected from 3 separate sites in northern Nevada in the summer of 2006 that represented salt desert, Wyoming big sagebrush and mountain big sagebrush environments. Cheatgrass seed was stratified at 5˚C for 2 weeks and then 3 seeds were planted into individual 2 qt. pots and replicated 6 times for each site in an outside environment. Planting took place the first week in March and watered weekly. Each pot was thinned down to 1 plant per plot. Cheatgrass was clipped the 1st of May at 30%, 60% and 90% as well as not clipped, 0%, for a control. Clipping took place at a time in which most cow calf operations have turned out in western Nevada. Biomass, tiller production, spikelet production, seed production, height and seed ripening date were all recorded at the time of seed ripening.

Figure 3. Intensive grazing on cheatgrass to reduce fuel loads leads to what has been termed "Half a Bite". The question arises on how do you accomplish this on a large scale and what are the side effects.

Table 1. Cheatgrass response to simulated grazing.
(1 = salt desert, 2 = Wyoming big sagebrush and 3 = mountain big sagebrush cheatgrass communities)

Trt	Site	µ Tillers	µ Spikelets	µ Seed	µ Wt.	µ Ht.
C	1	6.67	67.33	219.00	.92 g	48cm
C	2	5.67	56.33	183.33	2.11	44
C	3	4.67	50.00	160.67	4.13	48
30%	1	6.00	65.00	233.67	3.68	43
30%	2	3.33	48.33	151.00	4.64	46
30%	3	5.33	86.67	279.33	2.72	57
60%	1	6.33	57.00	188.00	1.64	46
60%	2	6.67	91.67	338.33	2.47	54
60%	3	7.67	88.33	315.67	4.13	48
90%	1	8.67	108.33	359.00	1.37	52
90%	2	6.67	81.33	285.00	1.68	54
90%	3	4.33	76.33	243.33	1.66	41

Results and Discussion

Simulated grazing of cheatgrass did enhance cheatgrass growth in many of the plants as we recorded an increase in biomass, tillers, spikelets, and seed production (**Table 1**). Germination and sprouting of cheatgrass occurred within 10 days for all pots. Cheatgrass collected from salt desert shrub community performed best at 90% utilization, Wyoming big sagebrush and mountain big sagebrush performed best at 60% utilization (Table 1). Seed ripening date in the salt desert cheatgrass community was affected by simulated grazing as seed ripening was delayed by as much as 4 weeks. There was no significant difference in seed ripening date in the Wyoming big sagebrush community, but in the mountain big sagebrush community simulated cheatgrass grazing sped up seed ripening by as much as 3 weeks.

When looking at Fleming et al. 1942 claim, our data suggests that they were indeed correct in pronouncing that early cheatgrass grazing can stimulate cheatgrass growth and added forage in which the livestock operator can come back and graze the added forage. We did however record data in which this did not hold true for all plants that we harvested (Wyoming and mountain big sagebrush cheatgrass collections had less biomass at 90% utilization than did the controls), but spikelet and seed production did increase which should be alarming. With this decrease in biomass one can come to the conclusion that this level of grazing would affect fuel loads, but how do livestock operators and resource managers affectively graze 90% on such large allotments. What is the affect of such grazing intensity on soil properties and how does this influence the cheatgrass seed production and seed banks? Our salt desert shrub cheatgrass was collected on rangelands permitted to the John Espil Sheep Company. This livestock operator said it would be impossible for his operation to achieve this level of grazing with his current 1,000 cow/calf and 4,000 domestic sheep stock. Cheatgrass inventories on this range suggest that whether the cheatgrass was 1" in height or 12" in height, cheatgrass still produced enough seed to sustain the population (148 cheatgrass plants/ft² above ground, 252 seeds/ft² in the seed bank).

Active efforts at suppressing and controlling cheatgrass are indeed noble and needed, grazing may be part of the equation (fuel reduction), yet cheatgrass appears to have the ability to respond positively to various grazing intensities.

Literature
Fleming, C. E., M. A. Shipley and M. R. Miller. 1942. Bronco grass (Bromus tectorum) on Nevada ranges. Bull. 158, Nevada Agric. Exp. Sta., Reno, NV.

Platt, K. and E. R. Jackman. 1946. The cheatgrass problem in Oregon. Bull. 668, Oregon Agric. Exp. Sta., Corvallis, OR.