The Effect of Annual Precipitation on *Agropyron cristatum* Suppression of *Bromus tectorum*

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The best means of sustainable cheatgrass (*Bromus tectorum*) management is the establishment of a long-lived perennial grass. Perennial grasses are the keystone to a cheatgrass resistant plant community.

Cheatgrass Suppression

The concept of cheatgrass suppression by perennial grass has been known for decades and reported on by A. C. Hull and others since the 1940's. However research on the specific mechanisms that suppress cheatgrass has been limited.

We have observed that in years of increased precipitation cheatgrass suppression decreases. Based on these observations we hypothesized that by increasing water availability cheatgrass densities would increase in a stand of crested wheatgrass (*Agropyron cristatum*) exhibiting good suppression.

Methods

Site: Crested wheatgrass post fire seeded stand
with an average density of 4.27 crested plants /m^2
Precipitation during study (Jan – June 10th) 4.8 cm

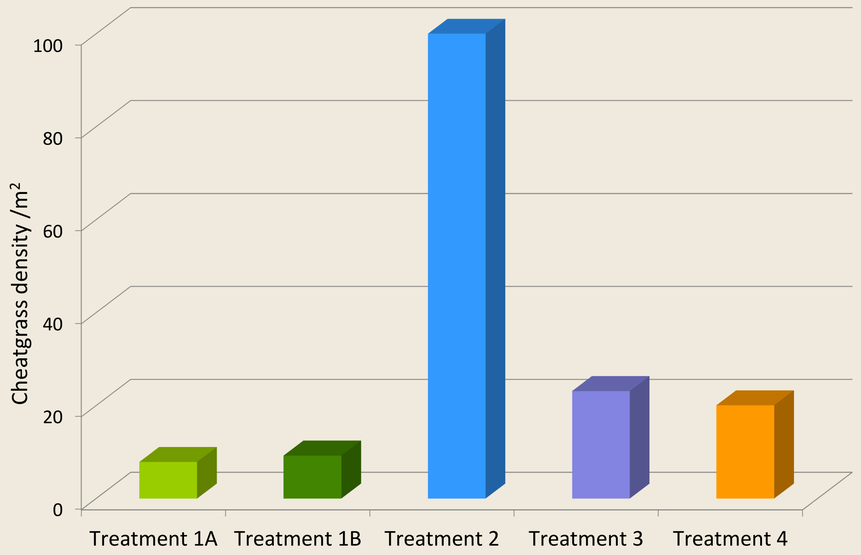
Plots: 9m^2 with 4 replicates per treatment

Cheatgrass seed bank: Bioassay January 5th (77.5 seeds/m^2)
each treatment plot (9m^2) was given 30g of cheatgrass seed (~9000 seeds [1000/m^2])

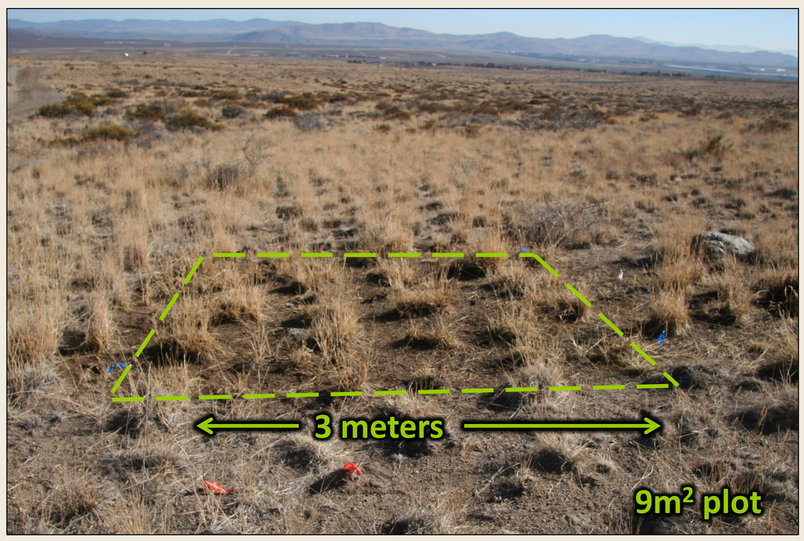
Treatments: 1) control **A.** *No* water **B.** *No* water, *No* crested wheatgrass
2) 4.57cm*total water added,
3) 1.52 cmtotal water added
4) 1.52 cmtotal water added *No* crested wheatgrass

Watering dates: Jan 15, March 15, April 11, May 14, May 29 2014
(*total water divided by 5 dates)

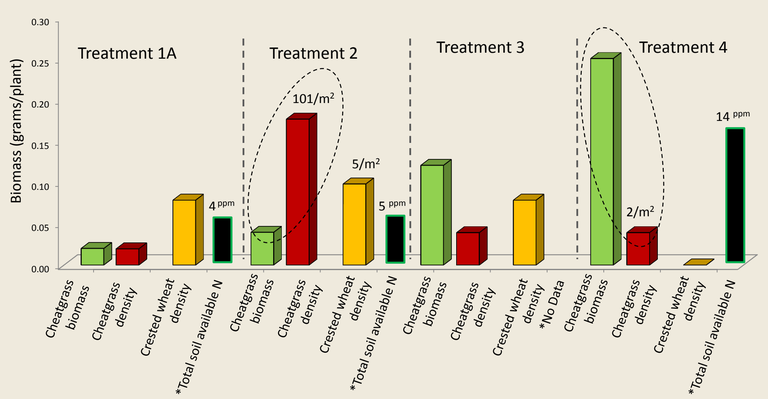
Sampling : June 9th 2014, 16 random (1ft^2) per treatment



Results: There was significant increase in cheatgrass densities where water additions of 4.57cm were given (Treatment 2). Water additions of 1.52cm (Treatment 3 & 4) did not display as radical increases.



January 15th 2014, the first watering event.
Photo: Replicate plot (Treatment 2) 1.52cm water added



Biomass: Treatments that lacked crested wheatgrass (treatment 4 & 1B) had significantly larger cheatgrass plants. Interactions between cheatgrass density and biomass are also likely occurring (circles).

*Total nitrogen included $NH4^+$ and $NO3^-$

Treatment 1B Treatment 2 Treatment 4

Cheatgrass harvested June 9th. Size bars given for reference. *All bars equal 10 cm

Photo: May 10th 2014 cheatgrass comparisons

Treatment 1A: Low densities, small plants flowered in the "red" stage

Treatment 2: High densities, small plants, flowered in the "red" stage

Treatment 4: Low densities, larger plants, delayed flowering, in "green" vegetative stage