

# Competition Effects from Cheatgrass (*Bromus tectorum*) Differs Among Perennial Grasses of the Great Basin

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Competition from the exotic annual cheatgrass (*Bromus tectorum*) threatens millions of hectares of native plant communities in the Great Basin. Not only has increased fuels and fire frequency from cheatgrass invasion altered ecosystem biodiversity, the highly competitive nature of cheatgrass can also make management, restoration, and preservation attempts largely ineffective.

The perennial grass component of the plant community is key to resisting cheatgrass invasion and dominance. However at the seedling phase cheatgrass (the annual) will outcompete all Great Basin perennial grass seedlings often leading to seedling failure of the perennial grass.

In the 1970's range scientists like Eckert, Evens and Young observed the negative impacts of cheatgrass competition. and even earlier in the 40s range ecologist J. H. Roberston stated that perennial seedling establishment in cheatgrass stands is a rarity.

## Methods

We observed first-year growth (biomass) and survival of three native and one non-native rehabilitation perennial grasses in large outdoor non-irrigated soil containers using soils collected from three northwestern Great Basin USDA-ARS field sites. Perennial grasses observed were 'Hycrest' wheatgrass, Squirreltail, Bluebunch wheatgrass and Sandburg bluegrass.



With cheatgrass competition as the single treatment factor, perennial seedlings were grown individually or with cheatgrass (6 plants) for one growing season.



Squirreltail seedling with cheatgrass competition (right) and without competition (left)

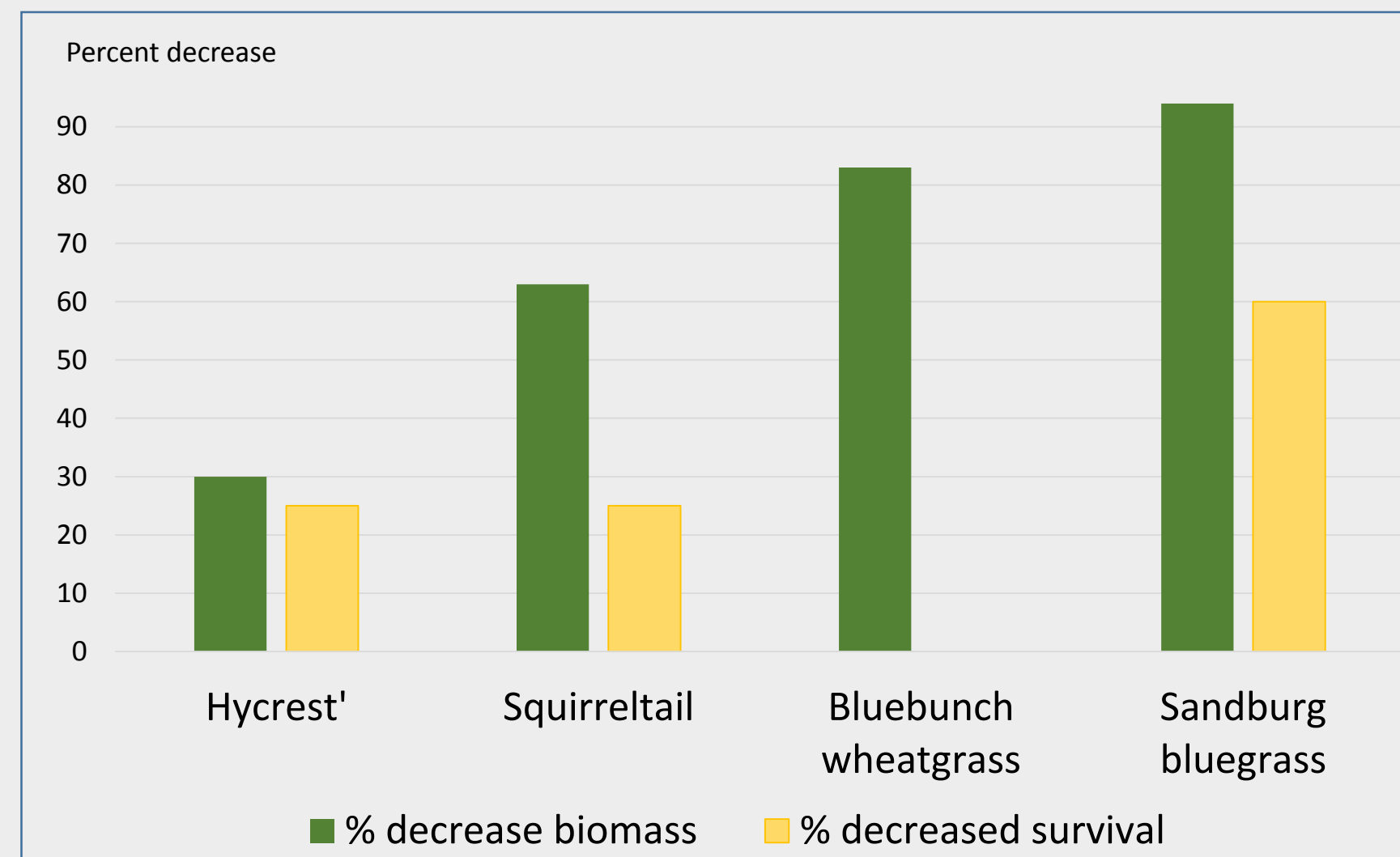
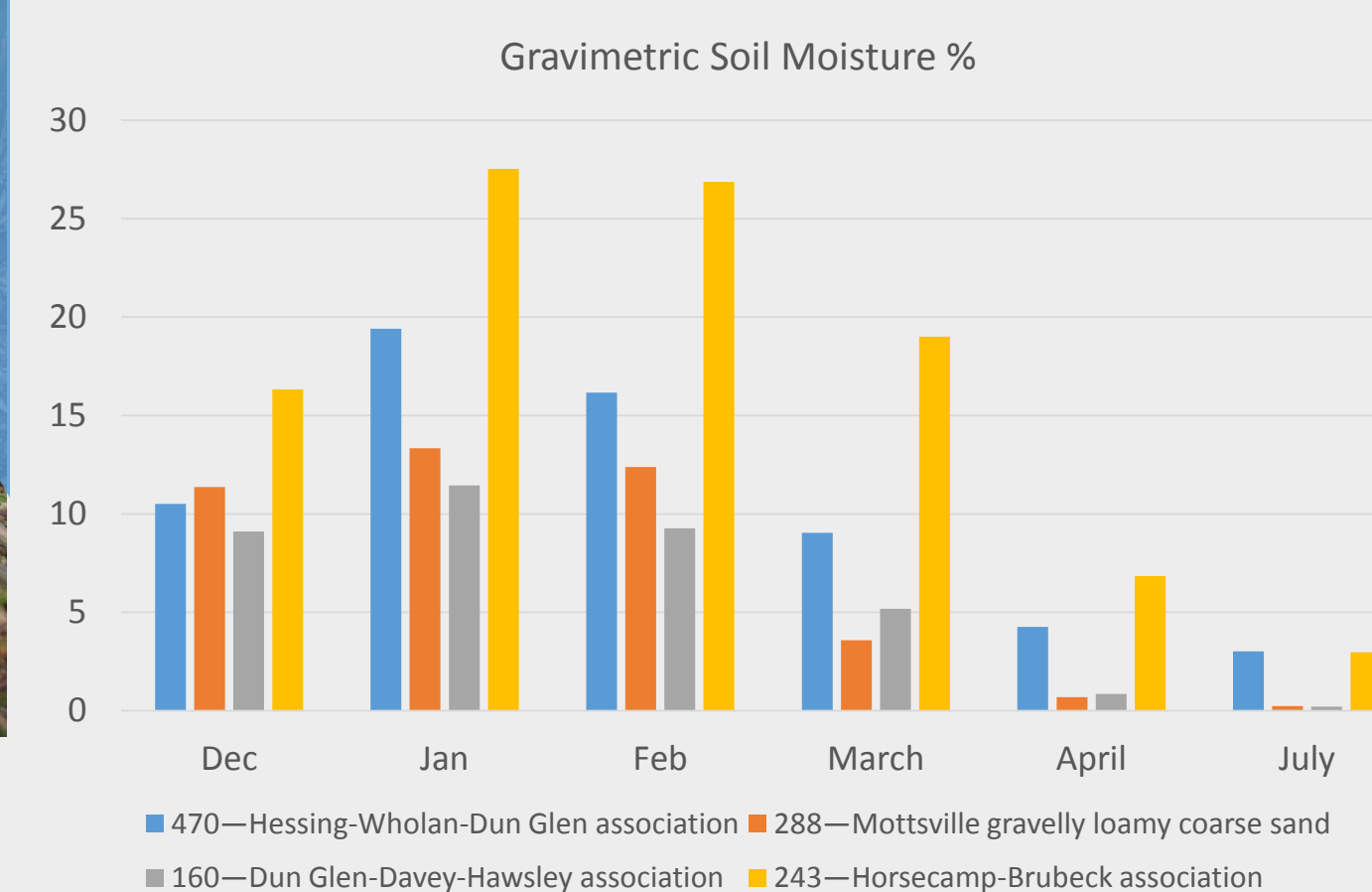
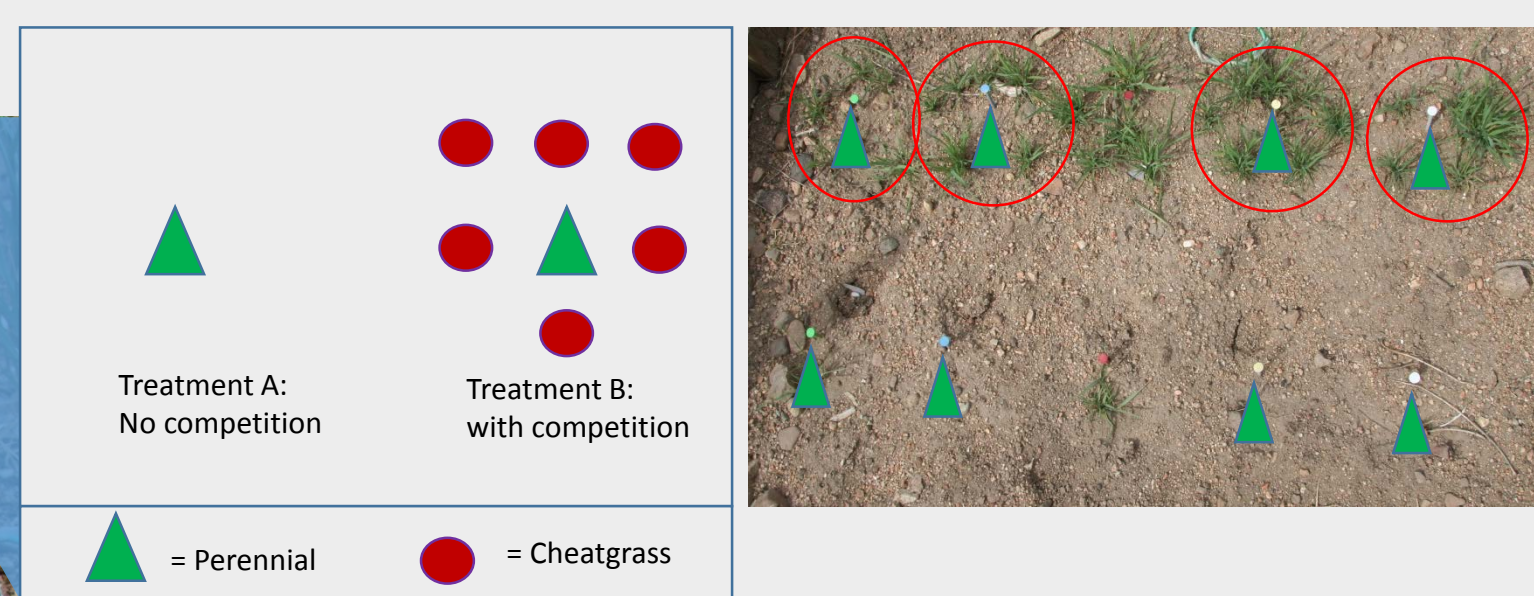


Figure 1. Percent decrease of first year seedling growth and survival of perennial grasses when competing with cheatgrass.

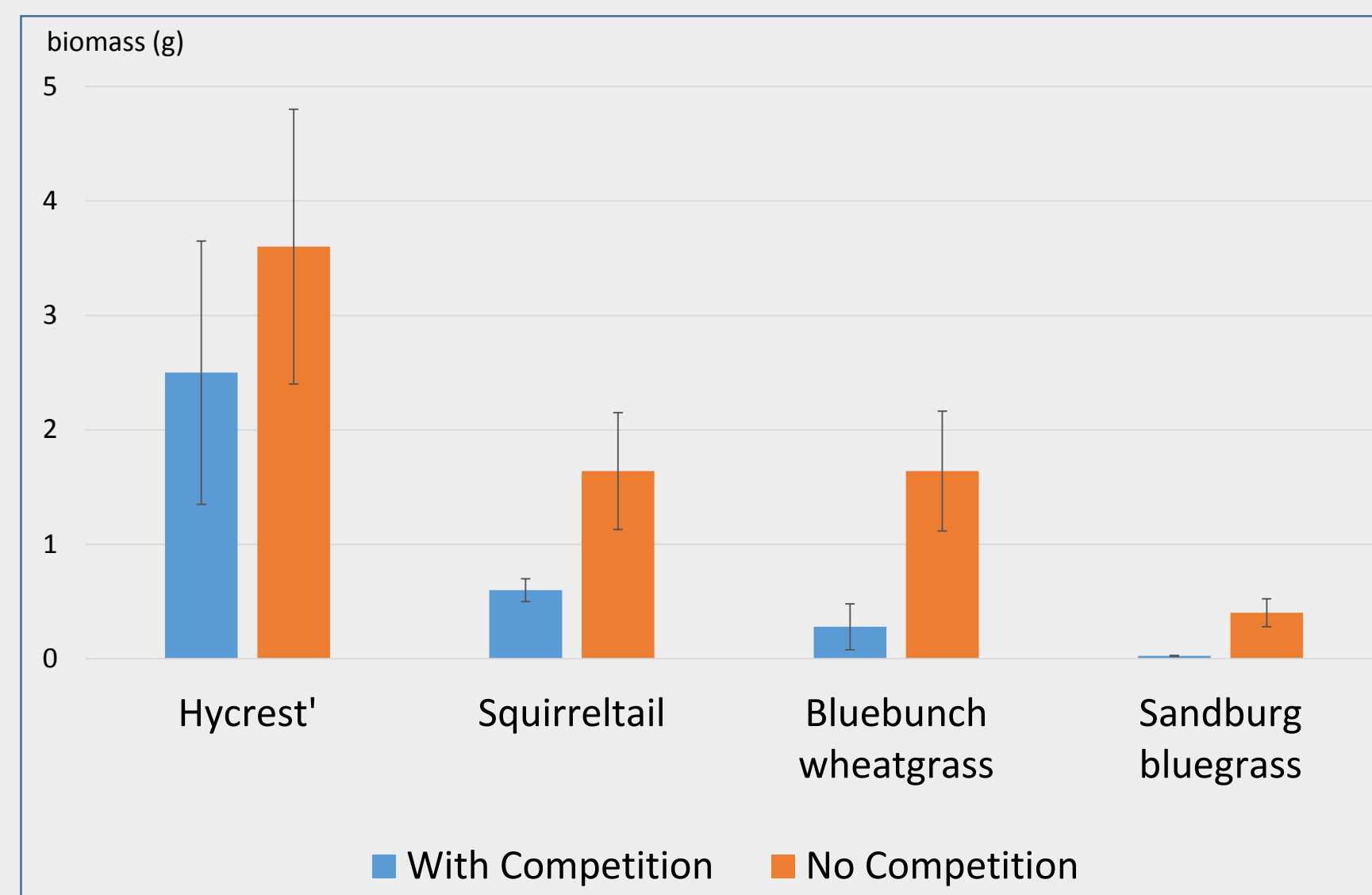


Figure 2. Biomass of first year perennial grass seedlings with and without cheatgrass competition. Seedlings harvested in July.

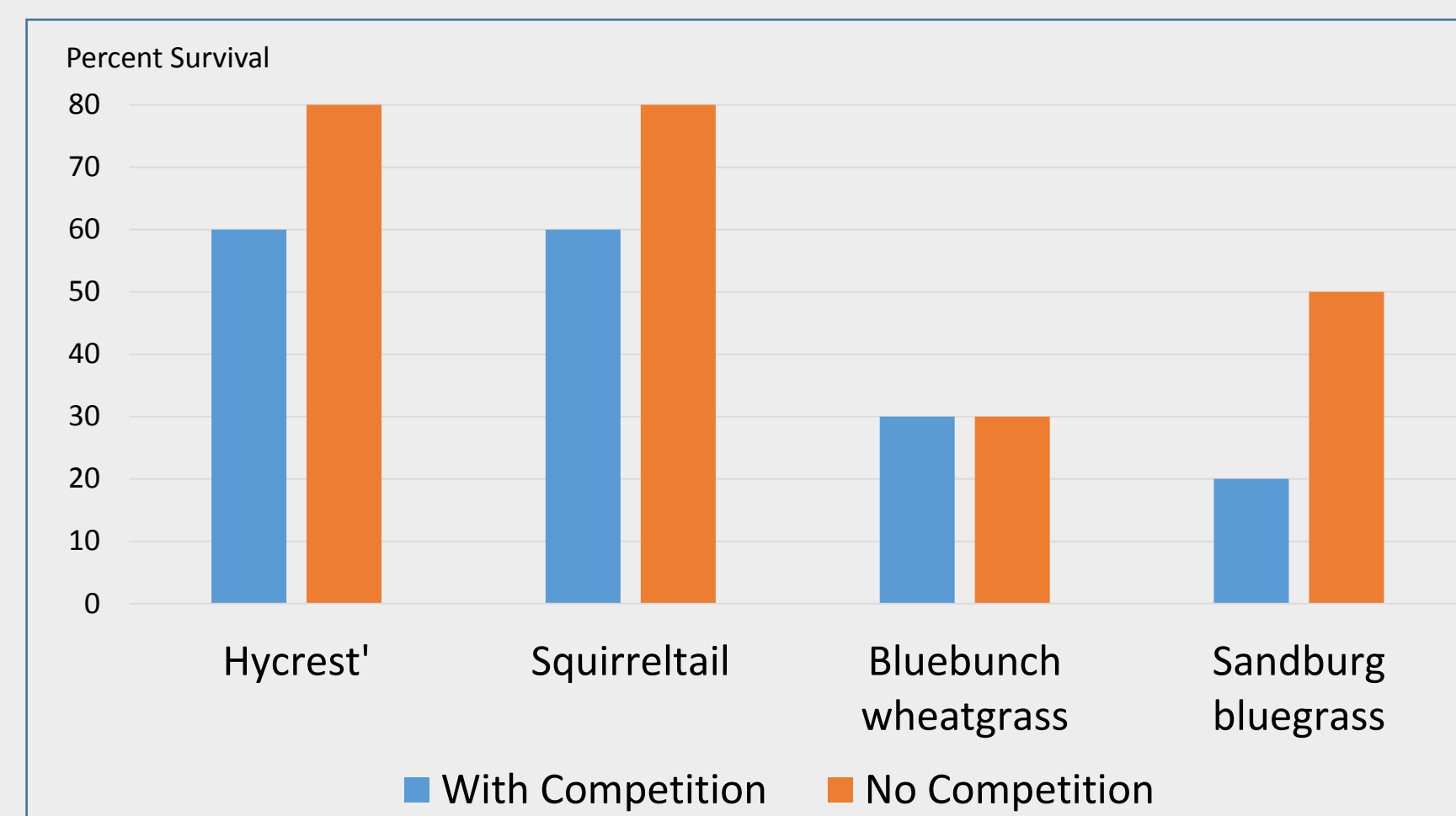


Figure 3. Percent survival of perennial grass seedlings with and without cheatgrass competition.

## Results

Growth of the non-native crested wheatgrass (*Agropyron cristatum*) decreased the least when competing with cheatgrass (30% decrease)(Figure 1), while the native Sandberg blue grass (*Poa secunda*) had the largest decrease in growth (94%). Squirreltail (*Elymus elymoides*) and crested wheatgrass had a 25% decrease in survival from cheatgrass competition (80% survival without competition), while Sandberg bluegrass had the largest decrease in survival (60%). Bluebunch wheatgrass (*Pseudorogneria spicata*) survival was not effected by cheatgrass competition (30% survival with and without competition).

Under non-competitive conditions, crested wheatgrass has been observed to have higher growth rates compared to the three native grasses and our results found that disparity was greatly magnified by cheatgrass competition (Figure2). Even in the absence of cheatgrass competition the seedling vigor of Native perennial grasses is significantly less compared to selected grasses like 'Hycrest' crested wheatgrass (Figure 2). Survival of Bluebunch wheatgrass and Sandburg bluegrass was also greatly reduced compared to 'Hycrest' and Squirreltail which had similar survival rates (Figure 3).

This study's results emphasize the importance of cheatgrass control to decrease competition prior to seeding efforts using tools such as herbicides, especially if a native-only policy is implemented.

Herbicide Cheatgrass Control

**Plateau** (imazapic 23.6%) - \$175/gallon  
-rate 6oz/acre (25.4oz product/acre) = **\$35/acre**

**Landmark XP** (Sulfometuron 50%, Chlorsulfuron 25%)  
\$800/4lbs  
-rate 1.75oz/acre (66g product/acre)  
**\$29/acre**

