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Evaluation of plant competition is highly dependent on life stage and cycle. One of the largest problems the Great Basin faces is the competitive nature of the invasive, cheatgrass (*Bromus tectorum*).



Advantages of cheatgrass are often attributed to large seed production (seed banks), fall germination, rapid seedling growth and plasticity. These are all characteristics of annuals and focus on the seedling stage.

Our question is can a perennial grass be evaluated for competitiveness with seedling characteristics?



A perennial grasses competitive advantage is at the mature established phase where it can limit resources (soil moisture) so much that annuals (cheatgrass) are suppressed.



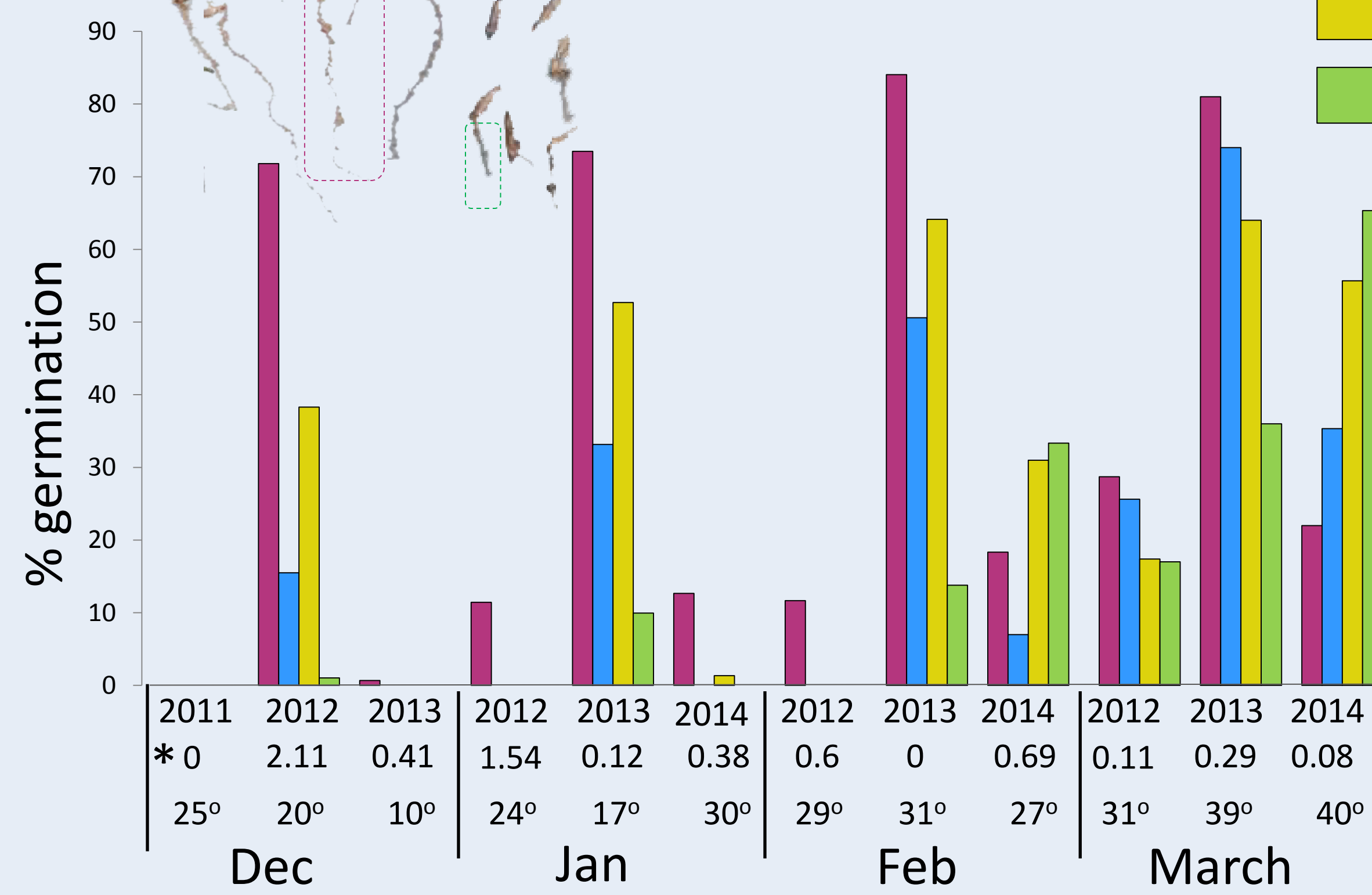
In order to become an established mature plant one must germinate, emerge, grow and survive the first year.

METHODS



Using replicated soil boxes (15ft³) with soil from long-term ARS research sites, we evaluated germination, emergence, biomass and drought survival of (n=25seeds) **cheatgrass** (*Bromus tectorum*) **'hycrest'** crested wheatgrass (*Agropyron cristatum*X) **bluebunch wheatgrass** (*Pseudoroegneria spicata*) **bottlebrush squirreltail** (*Elymus elymoides*)

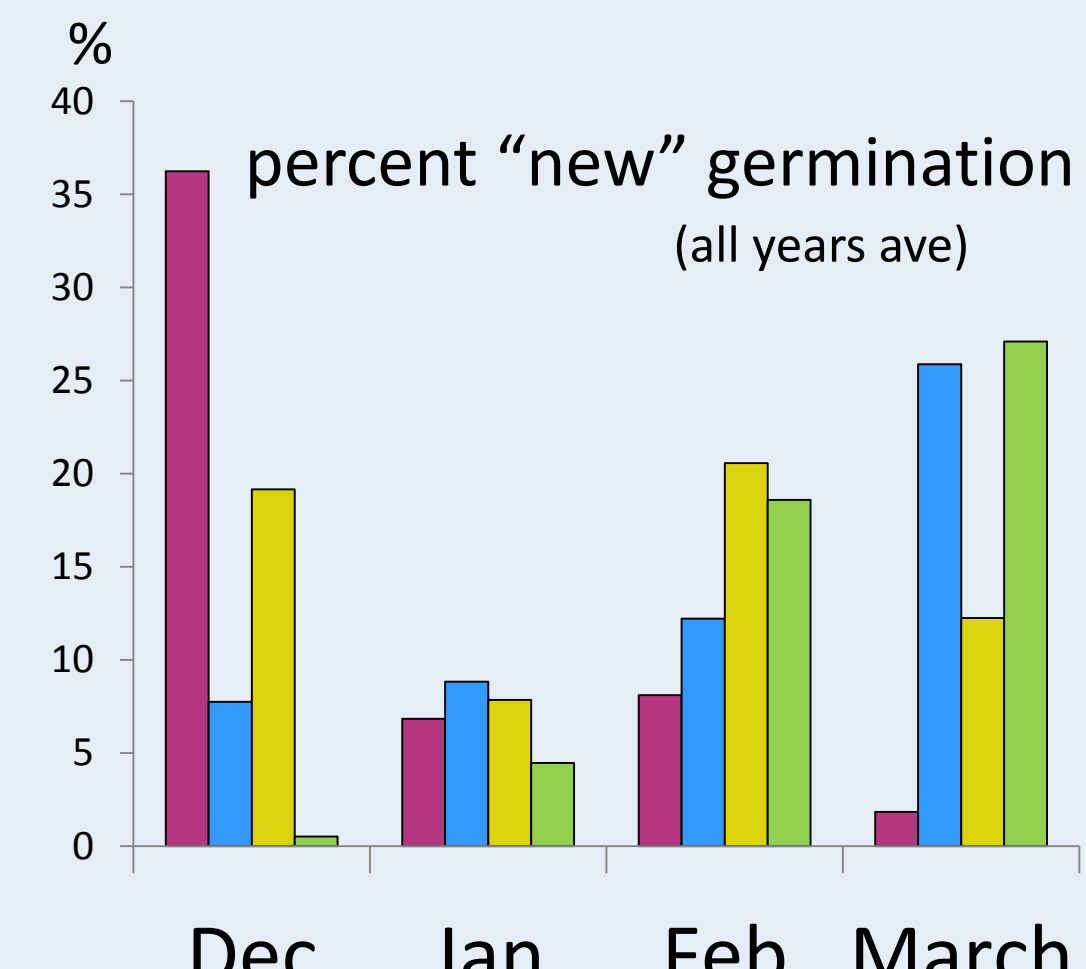
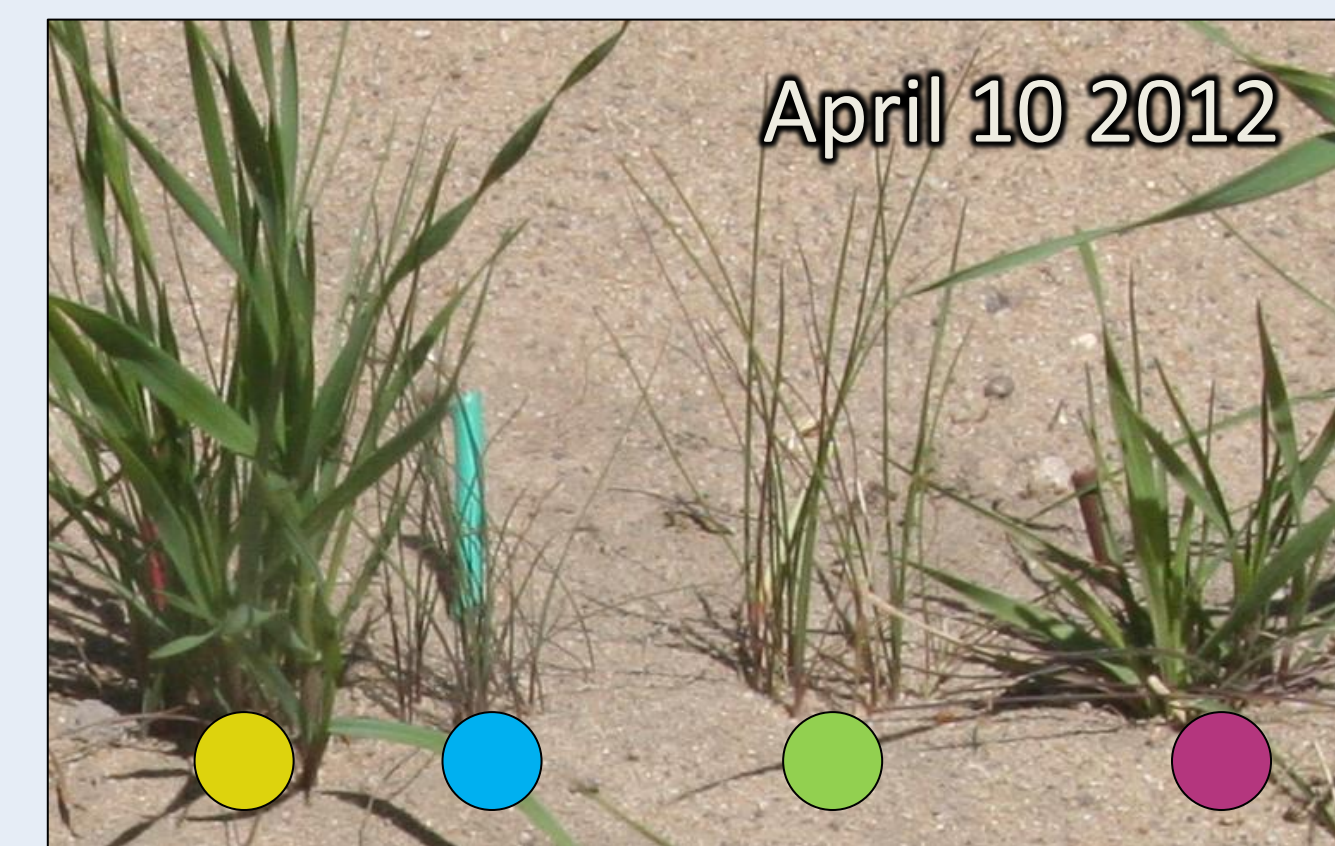
March 1 2012. cheatgrass (left) squirreltail (right) roots



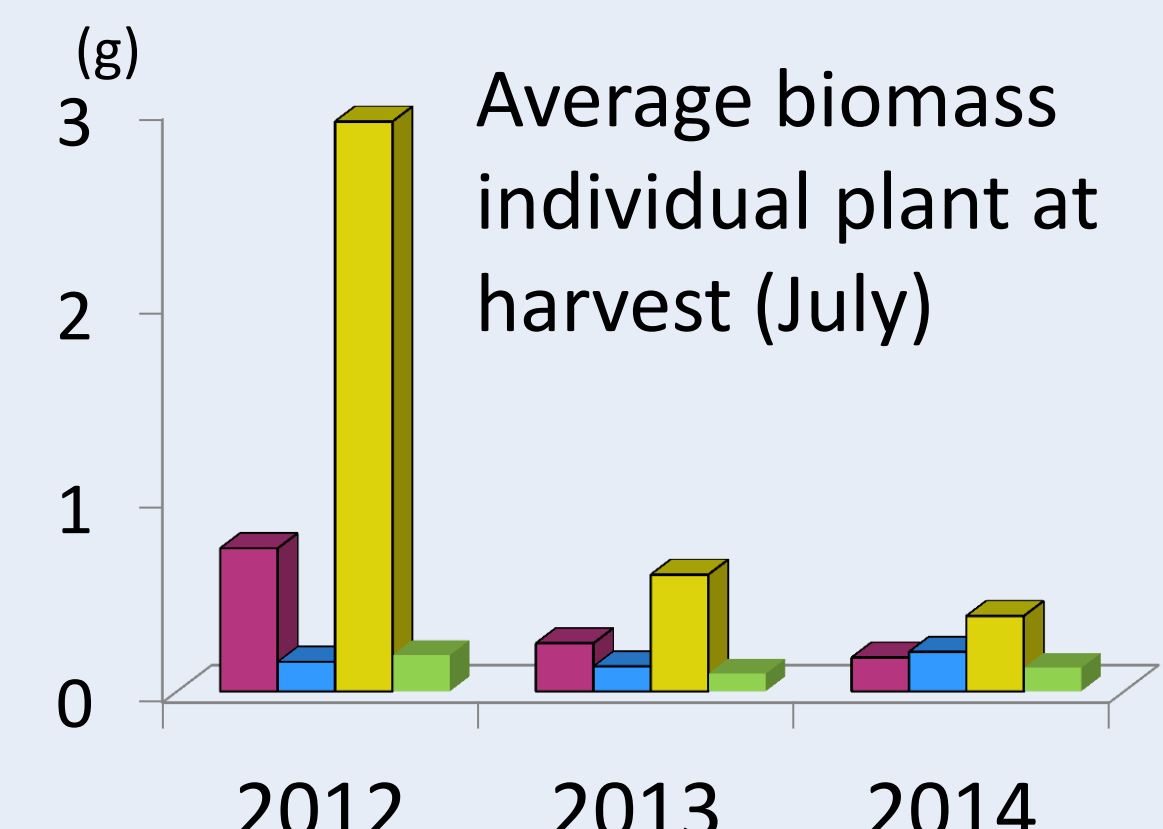
Germination: Maximum germination for each month. *Monthly precipitation (inches) and mean temperature (F)

Results

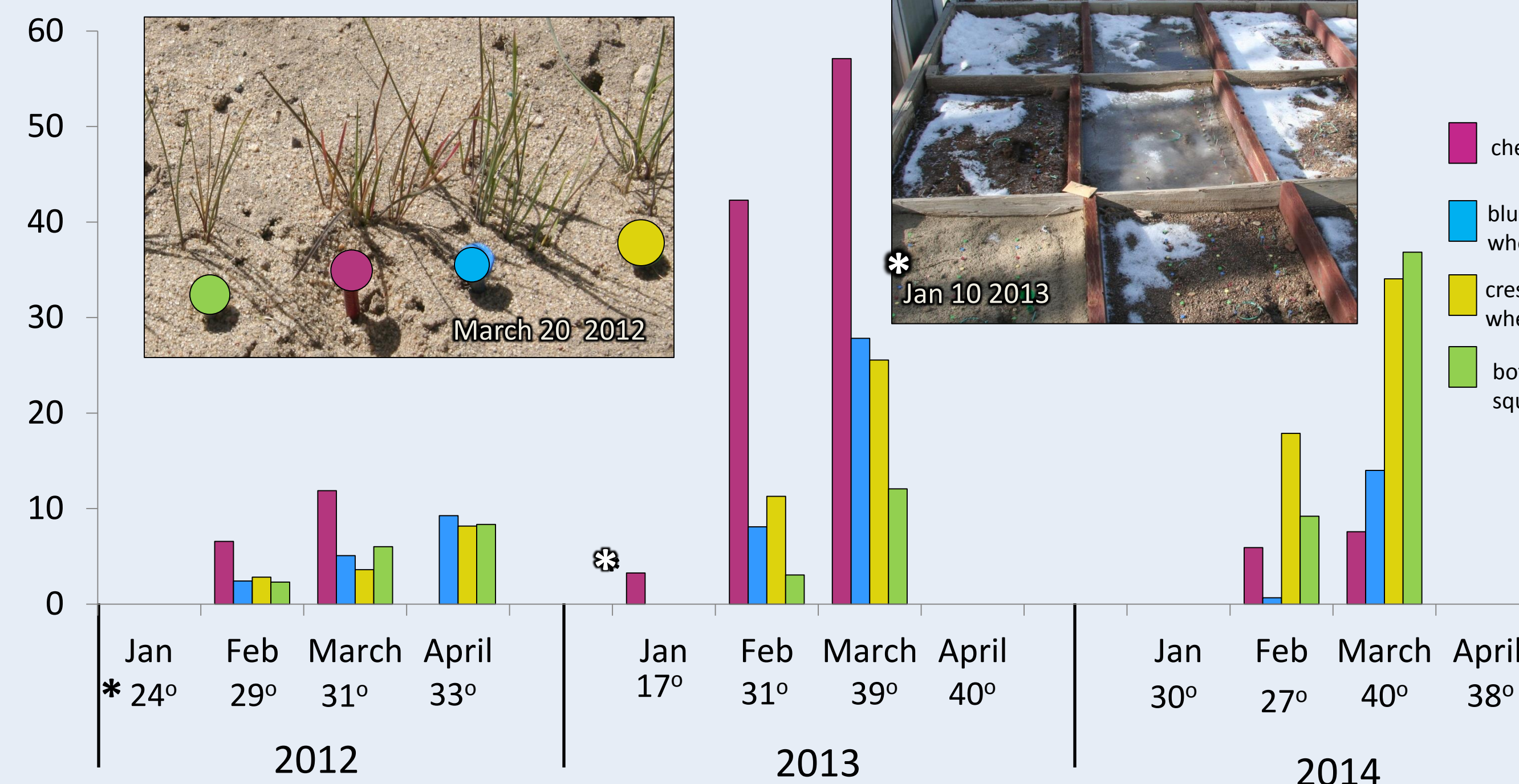
- cheatgrass
- bluebunch wheatgrass
- crested wheatgrass
- bottlebrush squirreltail



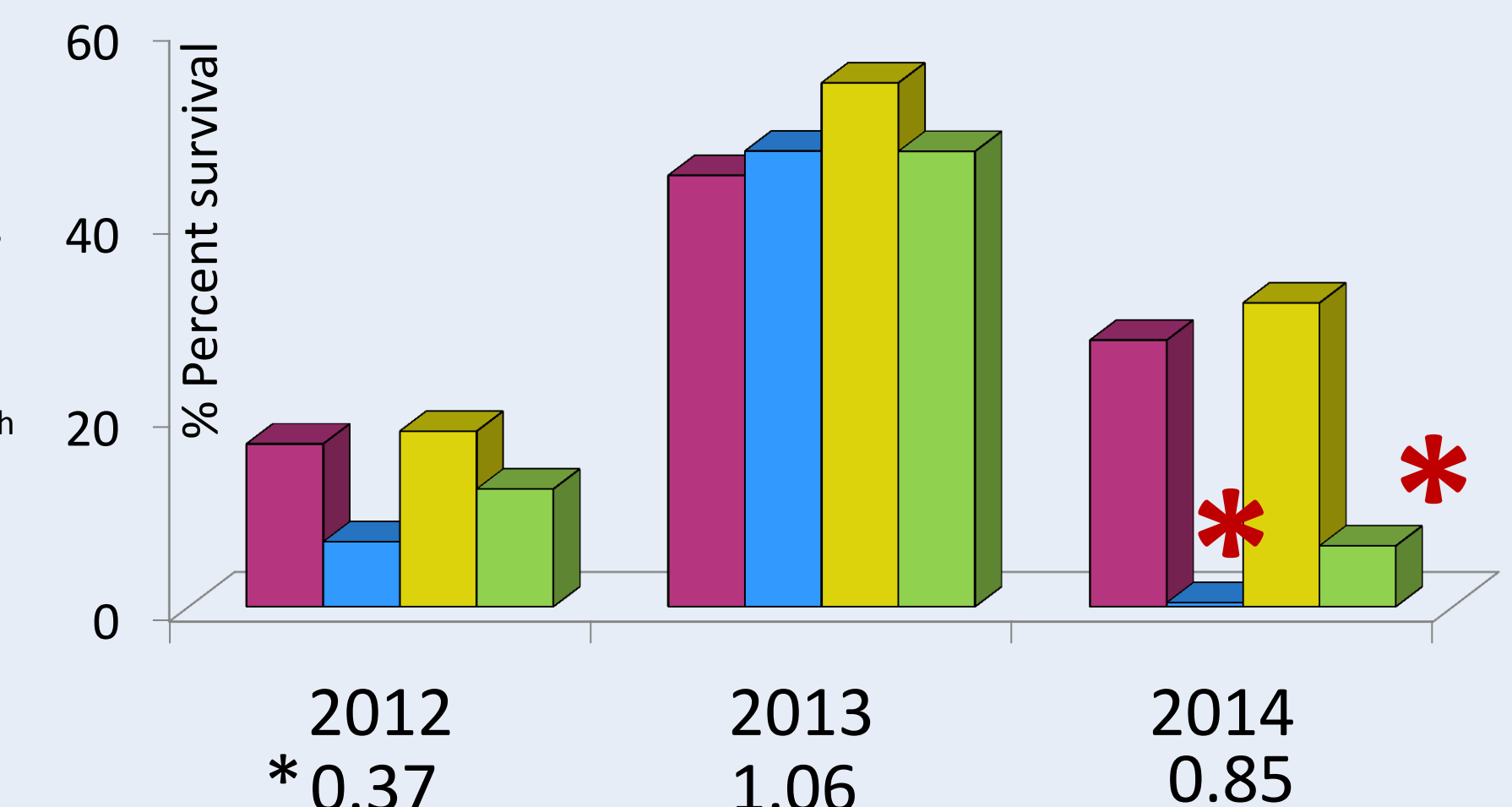
percent "new" germination (all years ave) Cheatgrass has early more complete germination while the perennials slowly germinate over months.



Biomass: Crested wheat with good seedling vigor can have a large biomass if it survives soil drought.



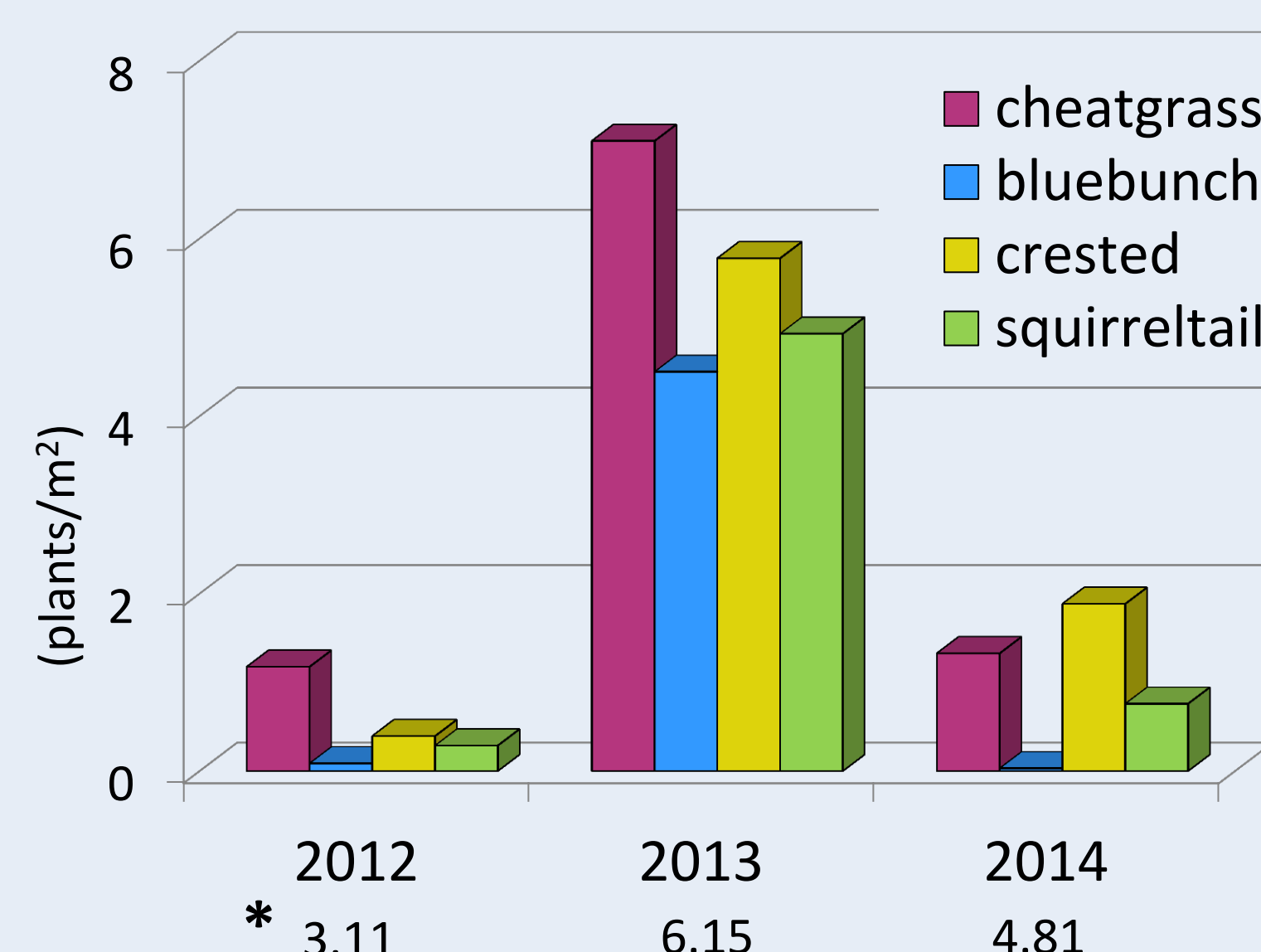
Emergence: Maximum percent (% of 25 seeds sample) emergence for each month. Cheatgrass can emerge with near frozen soil conditions (2013), however has little advantage during warmer years (2014). * Mean temperature (f)



Survival: The percent of emerged seedlings that survived to July. *Precipitation (inches) (April, May, June)

Discussion

While all indices likely interact and contribute to success. Surviving through dry conditions is critical if native grasses are to compete with cheatgrass or successful introduced rehab grasses such as crested wheatgrass *



Establishment: Number of seedlings that established (plants/m²) from a 7lb/acre seeding rate. Adjusted for max germination * Annual precipitation (inches) Oct-Sept

