

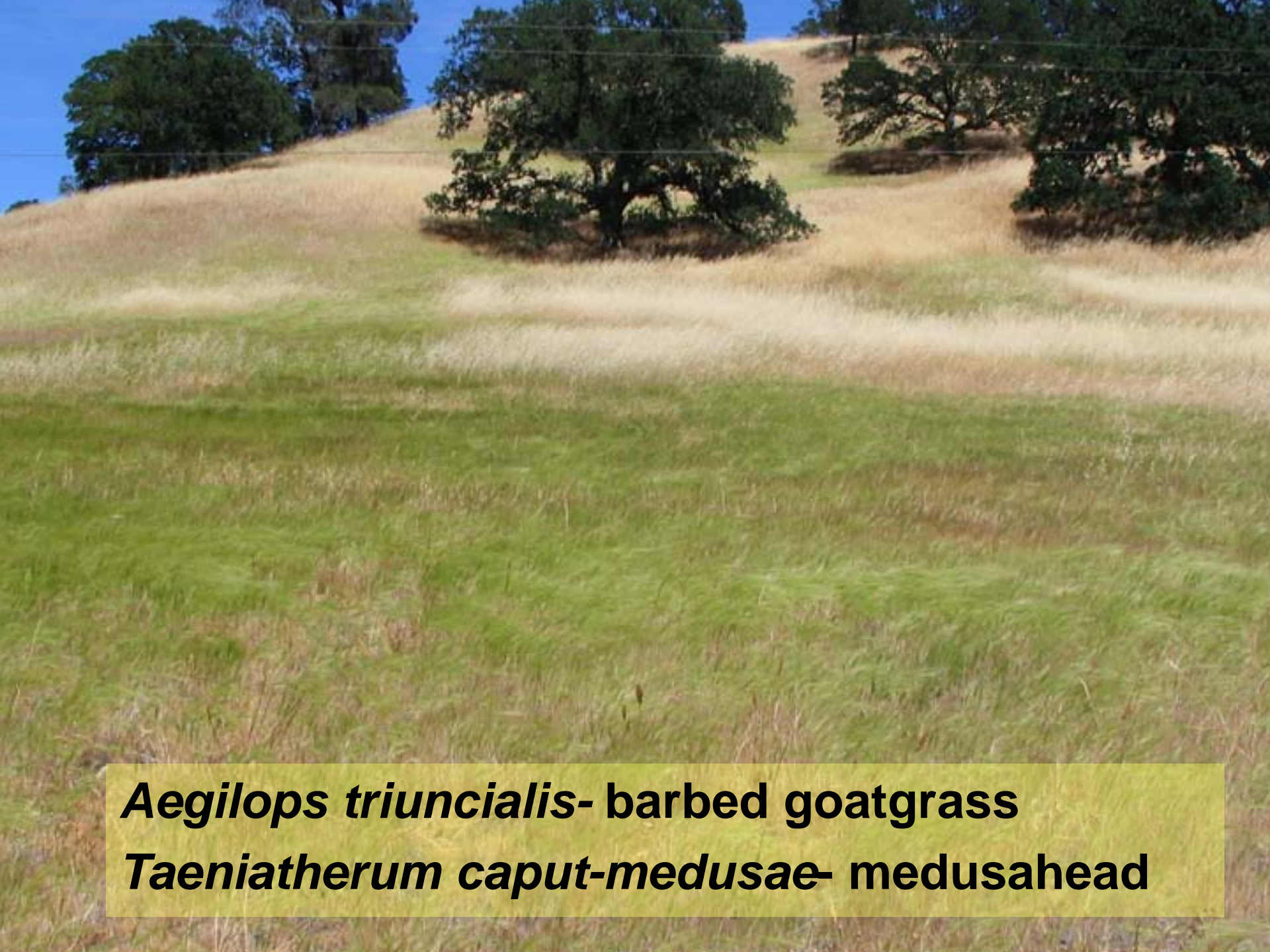
**Controlling the invasion of  
noxious rangeland weeds into  
an exotic-dominated grassland:  
Is there a role for native grass  
reseeding?**

**Valerie T. Eviner- U. of California, Davis**

**Kevin J. Rice- U. of California, Davis**

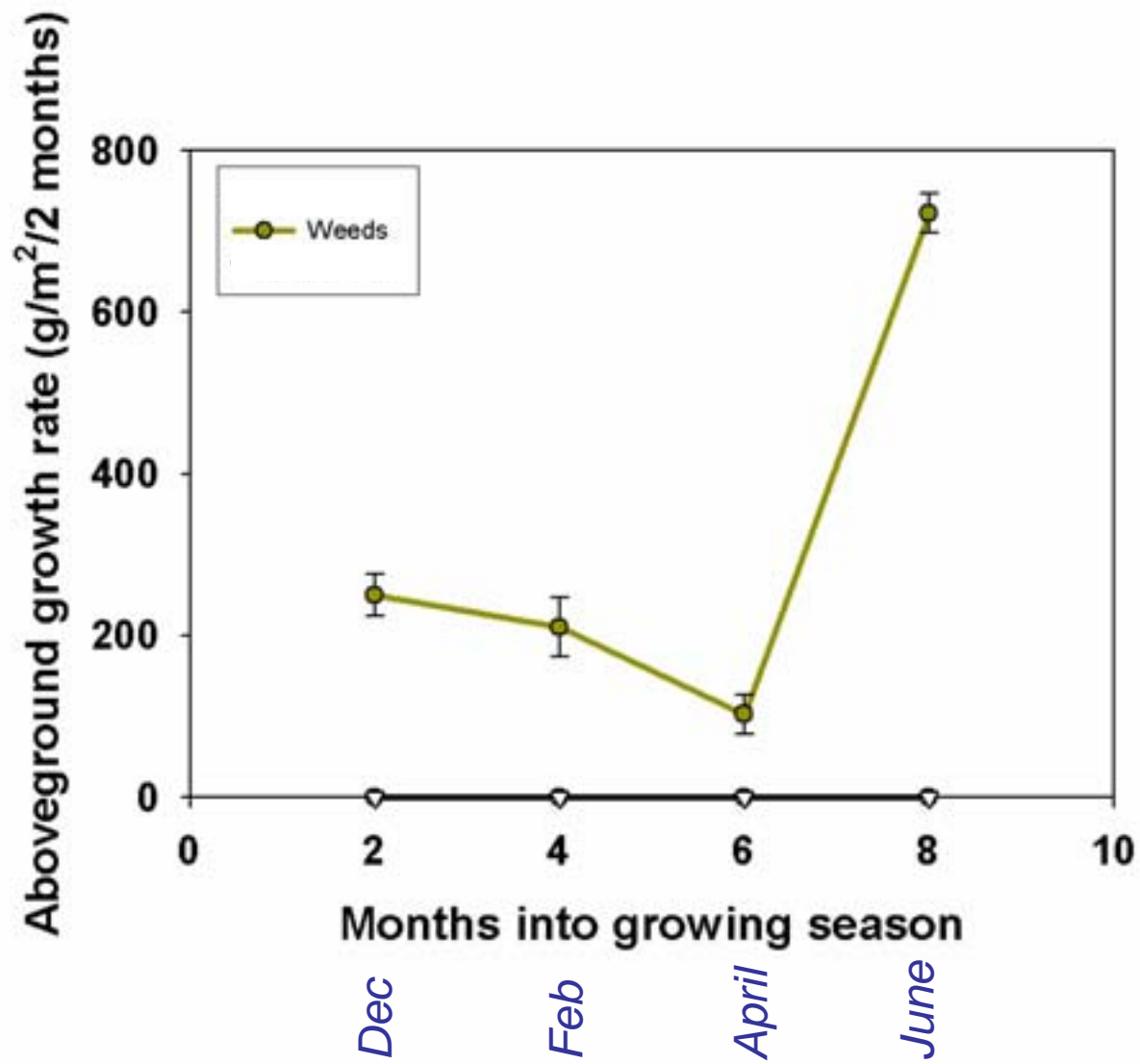
**Carolyn M. Malmstrom- Michigan State U.**

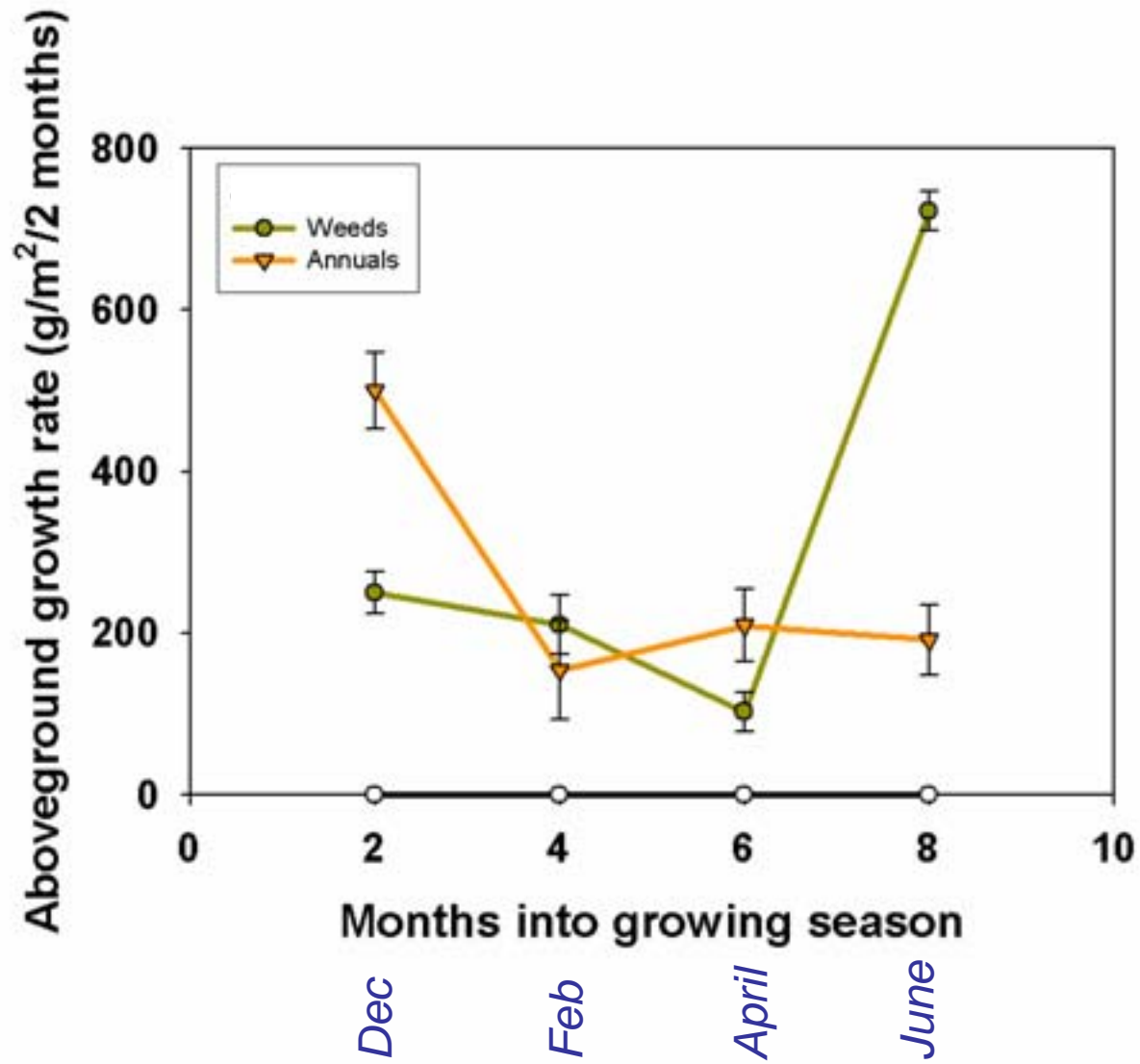


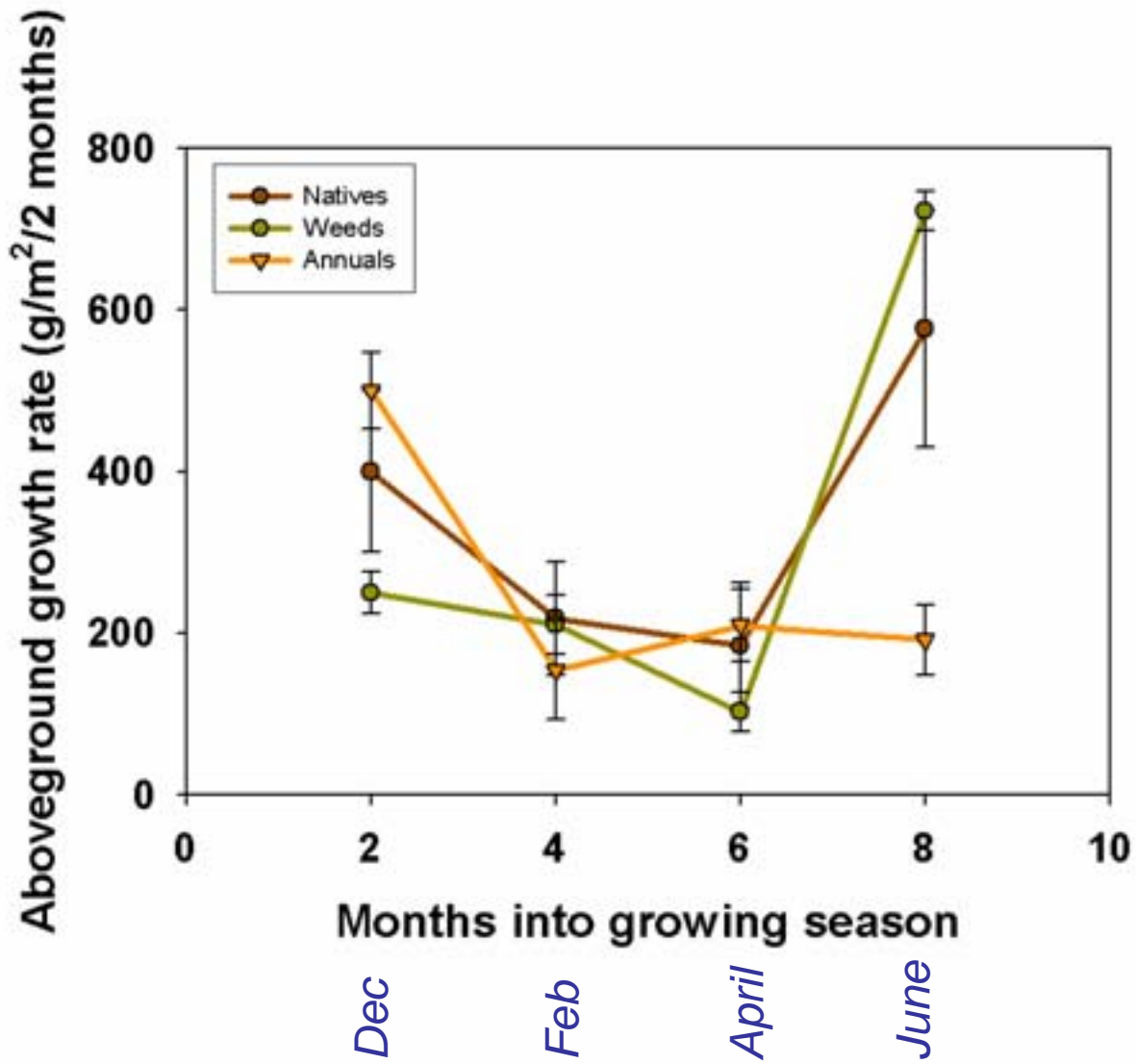


***Aegilops triuncialis*- barbed goatgrass**

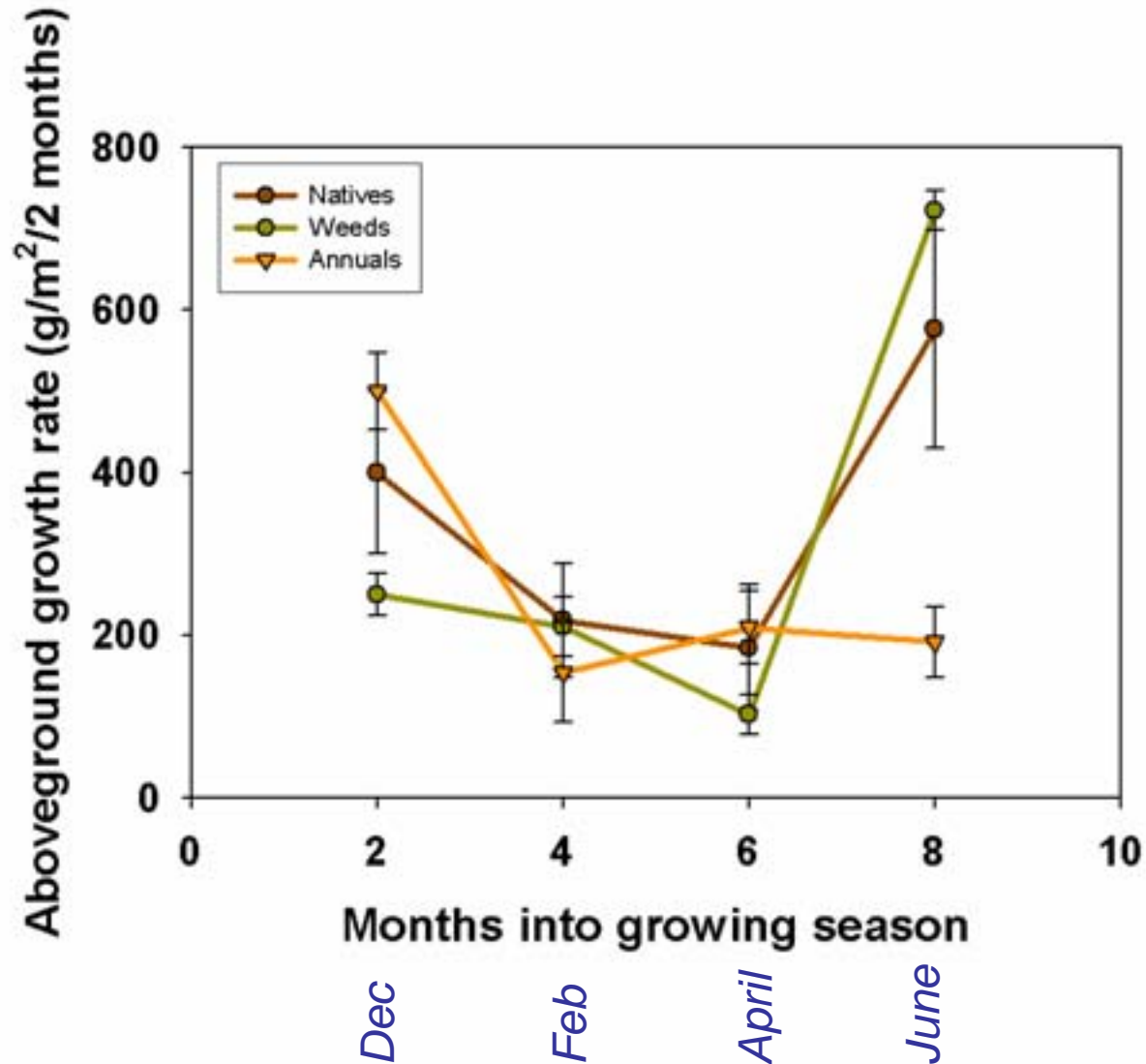
***Taeniatherum caput-medusae*- medusahead**







# Can we use native species that have the same phenology as noxious weeds to control weeds?





**Plot treatments: (24 replicates)**

***Monocultures of:***

**Exotic naturalized annuals**

*Avena fatua*

*Bromus hordeaceus*

*Lolium multiflorum*

*Trifolium subteranneum*

**New noxious weeds**

*Aegilops triuncialis*

*Taeniatherum*

*caput-medusae*

**Natives**

*Bromus carinatus*

*Elymus glaucus*

*Leymus triticoides*

*Lotus purshianus*

*Lupinus bicolor*

*Nassella pulchra*

*Poa secunda*

*Vulpia microstachys*

***Mixes :***

**Annuals**

**Weeds**

**Natives**

**Annuals + natives**

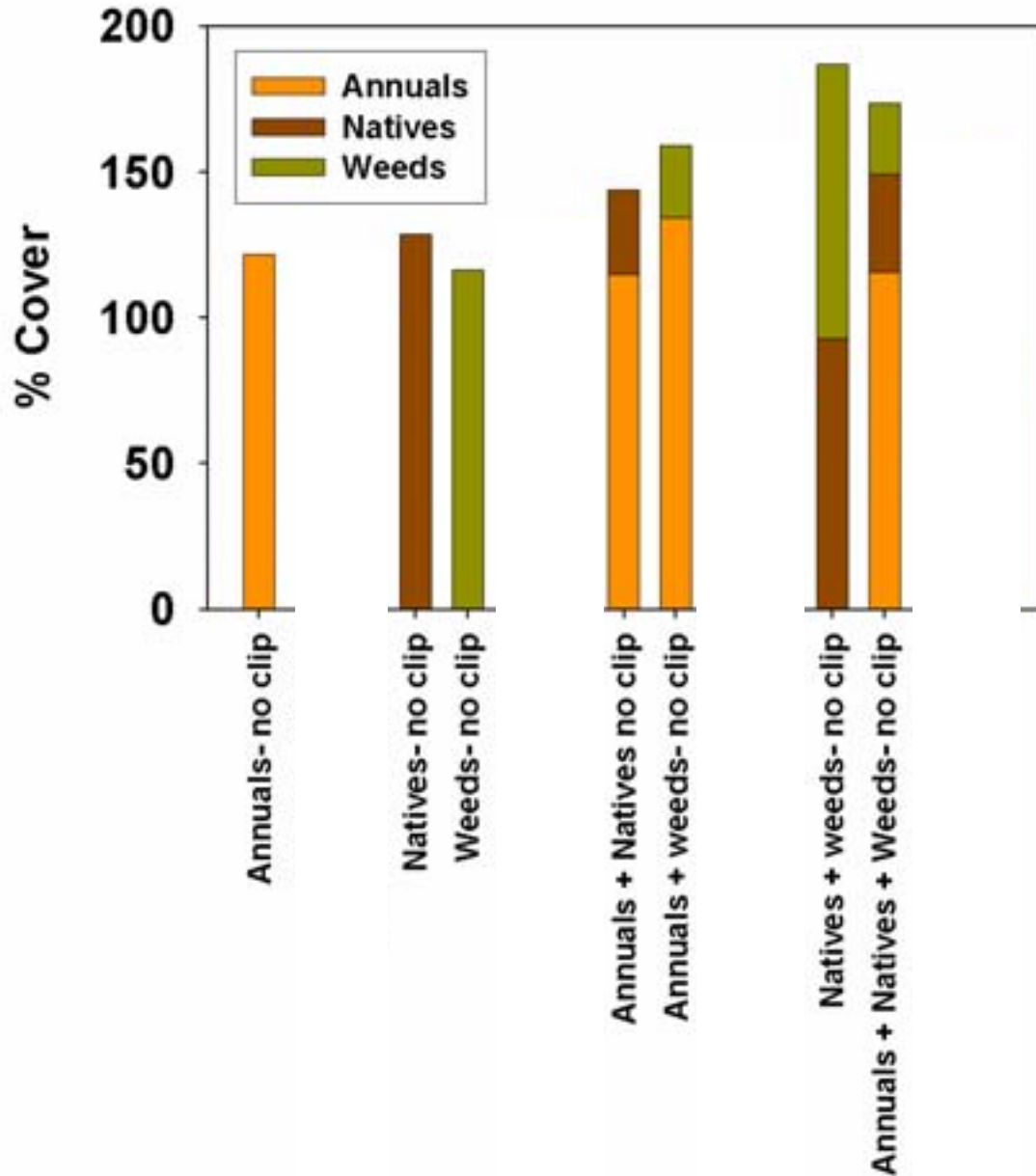
**Annuals + weeds**

**Weeds + natives**

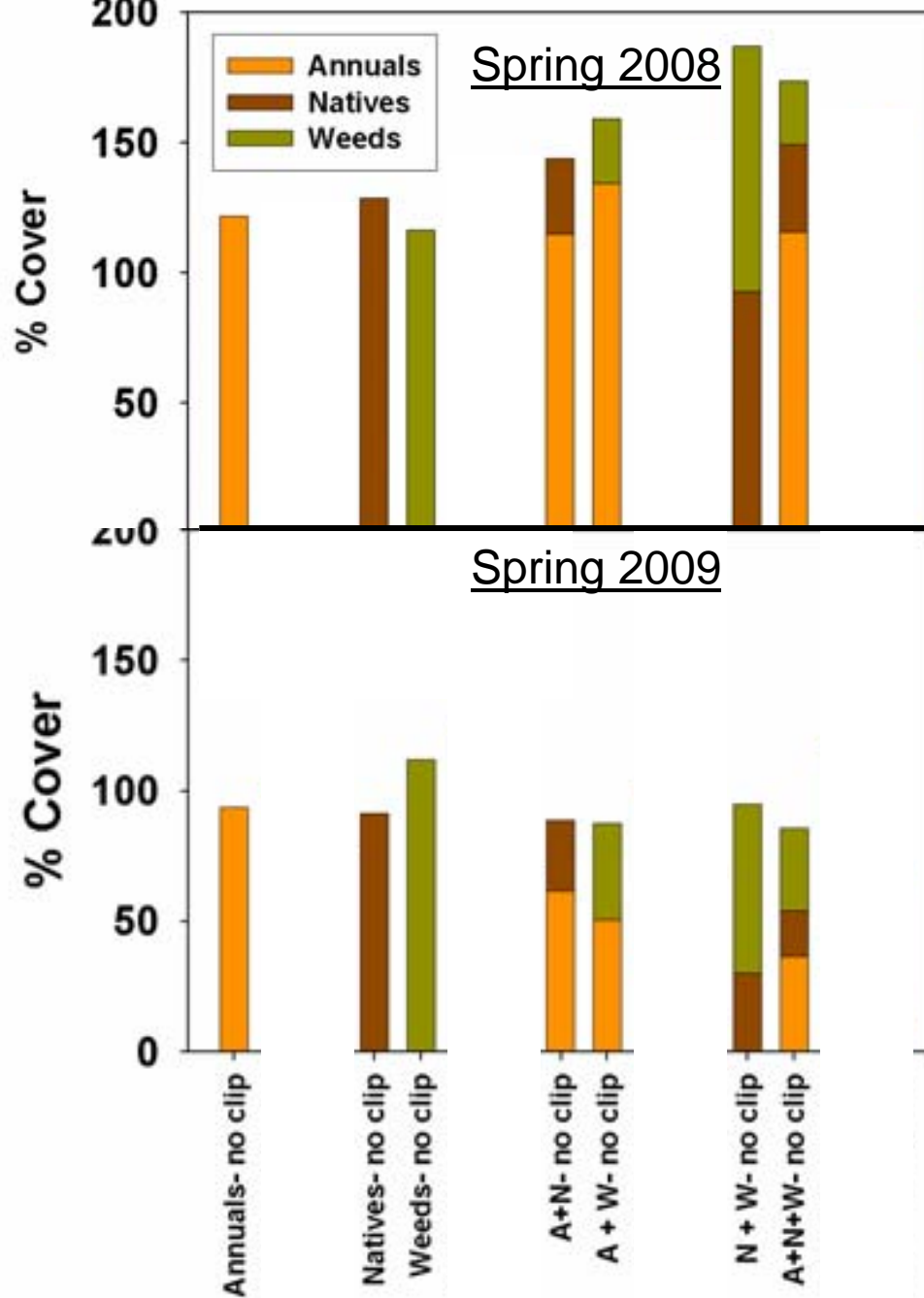
**Annuals + natives + weeds**



Spring 2008- 1<sup>st</sup> growing season



- Annuals strongly suppress natives and weeds
- Natives and weeds have minimum impact on one another, despite similar late-season phenology
- *Restoration of natives, by displacing annuals, increases weeds*

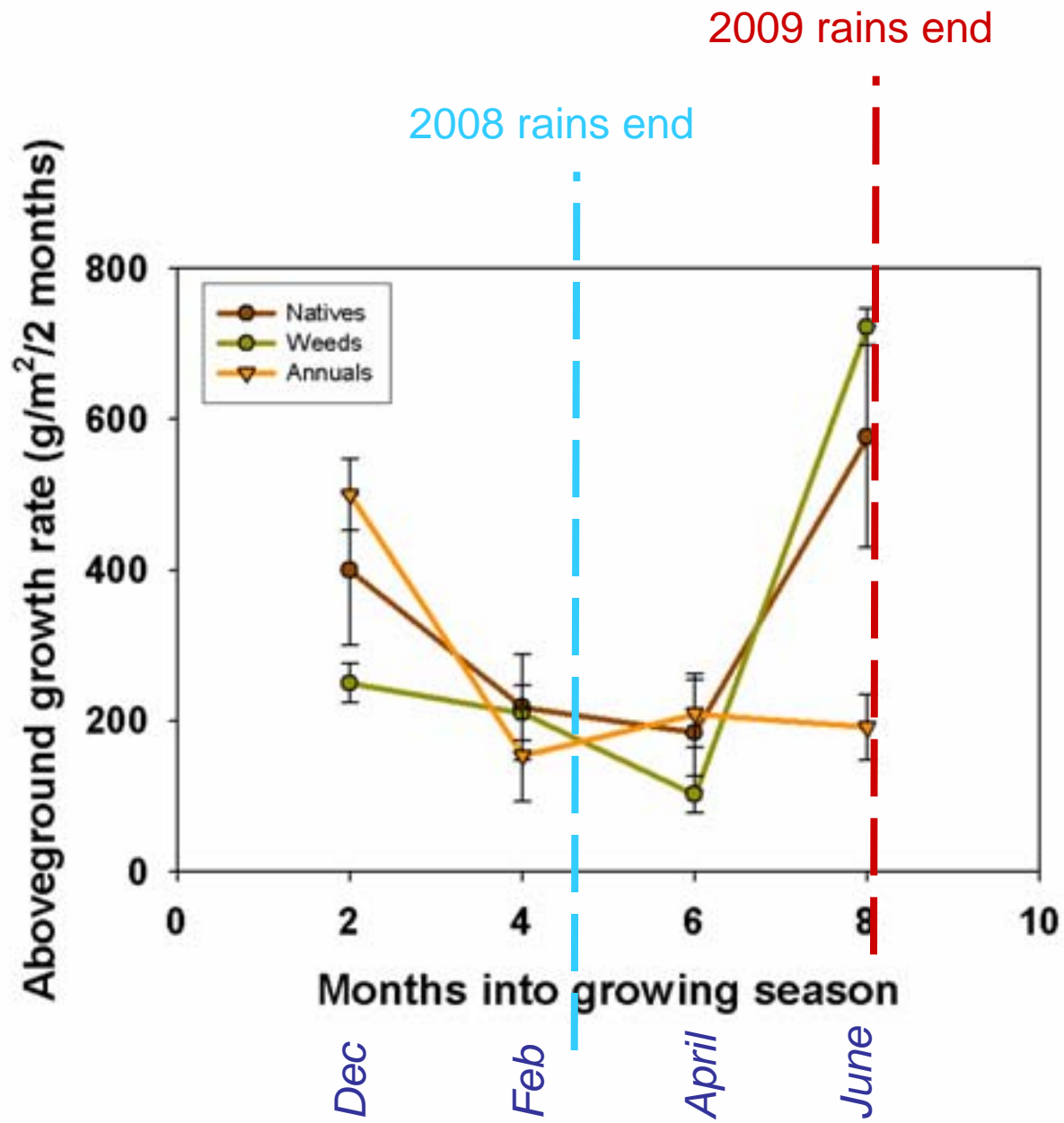


## In 2<sup>nd</sup> year:

- Annuals have decreased their prevalence in all mixes
- Weeds have increased their relative prevalence in all mixes
- Native cover did not change with annuals, decreased in presence of weeds
- *Annuals less effective in suppressing weeds*
- *Instead of natives suppressing weeds, weeds suppress natives*

# Why difference between 1<sup>st</sup> and 2<sup>nd</sup> year?

- Changes in weather conditions
- Changes in which species dominate within groups between years



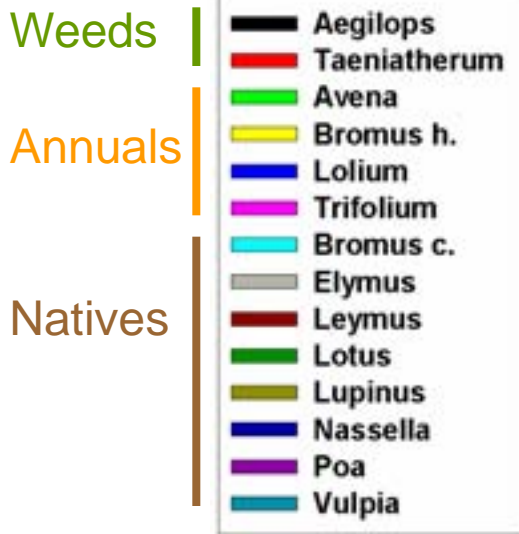
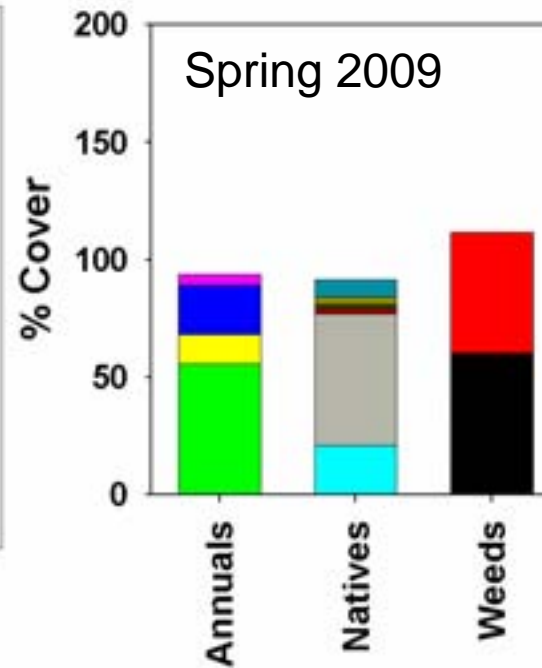
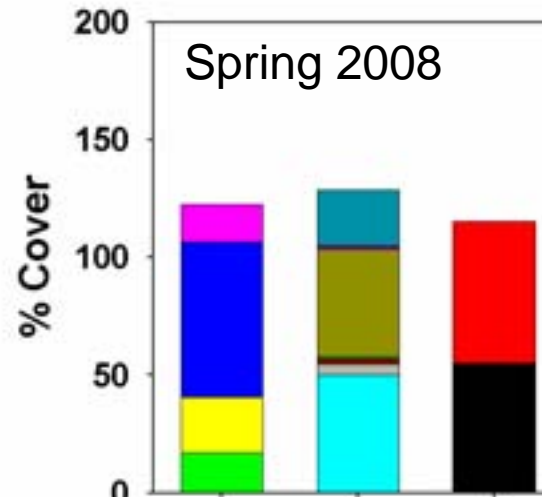
# Why difference between 1<sup>st</sup> and 2<sup>nd</sup> year?

- Changes in weather conditions- *partial explanation (will confirm with rainfall manipulations)*
- Changes in which species dominate within groups between years

# Changes in which species dominate within a group:

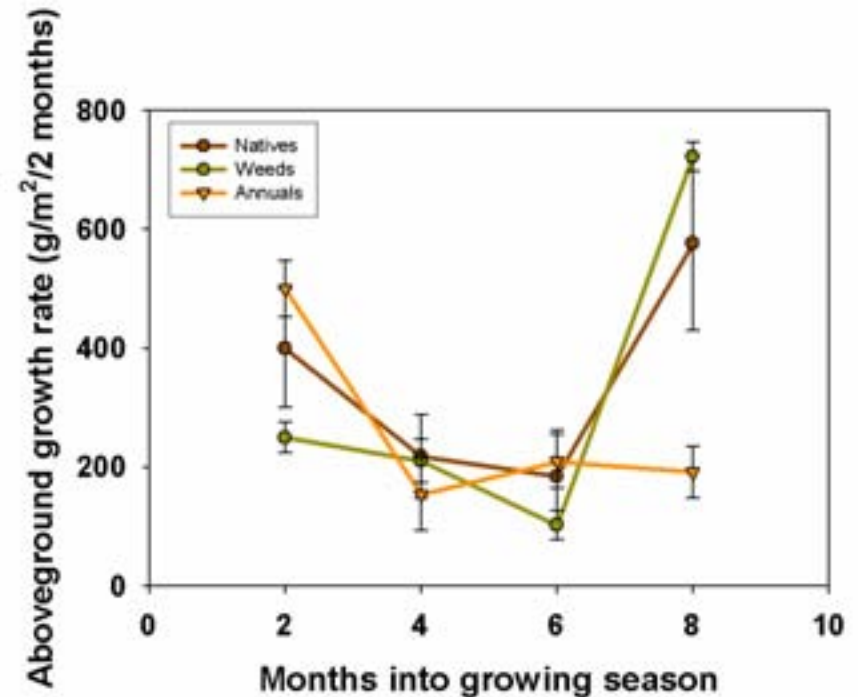
-Annuals- *Lolium* (late season) to *Avena* (mid-season)

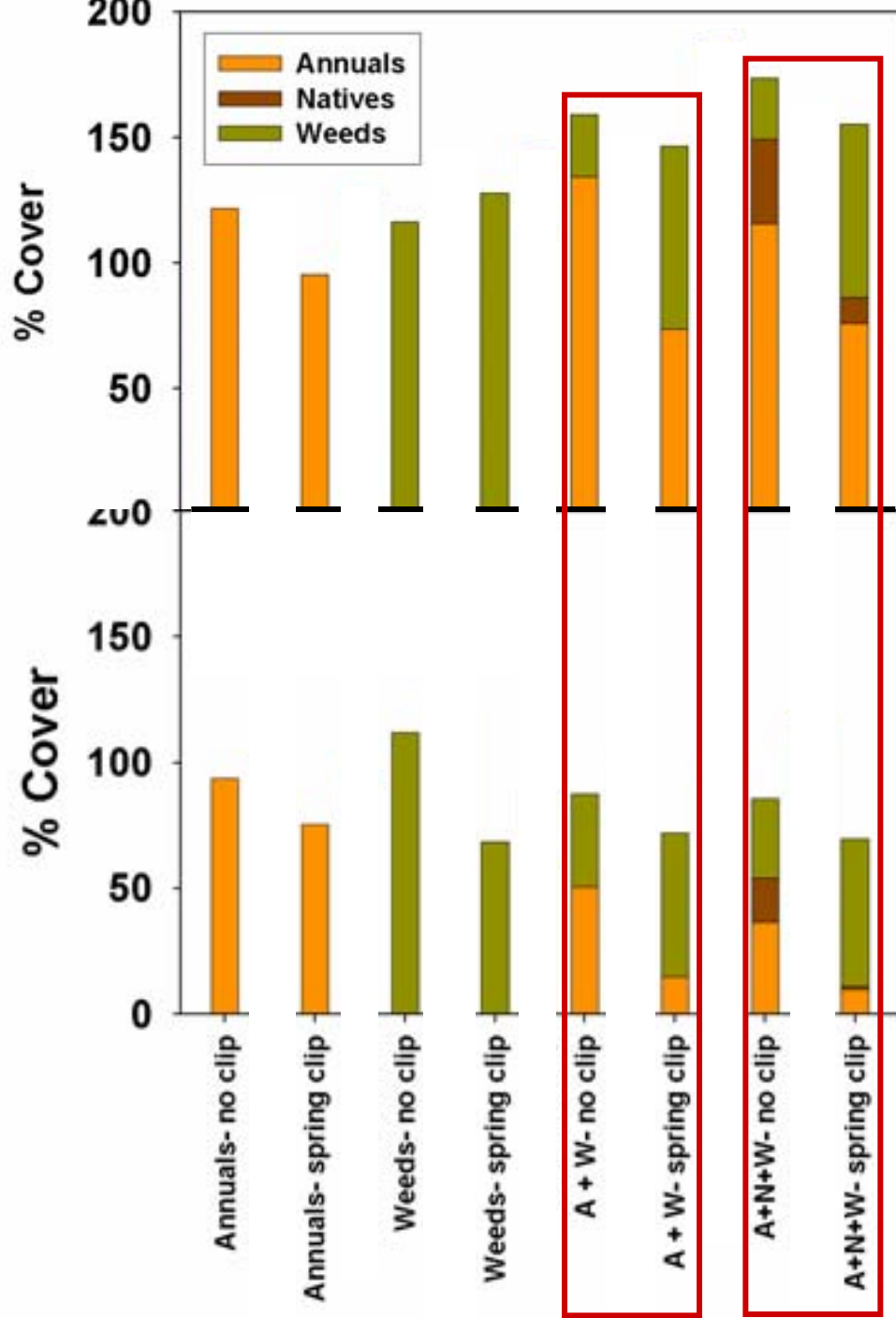
-Natives- short-lived natives and legume to long-lived perennial bunchgrass



# Can we use species with overlapping phenology to compete with noxious weeds?

- Despite overlapping phenology, natives do not suppress weeds (but weeds suppress natives in 2<sup>nd</sup> year)
- *Lolium* appears to be most promising species for excluding weeds
- Variation in rainfall seasonality important



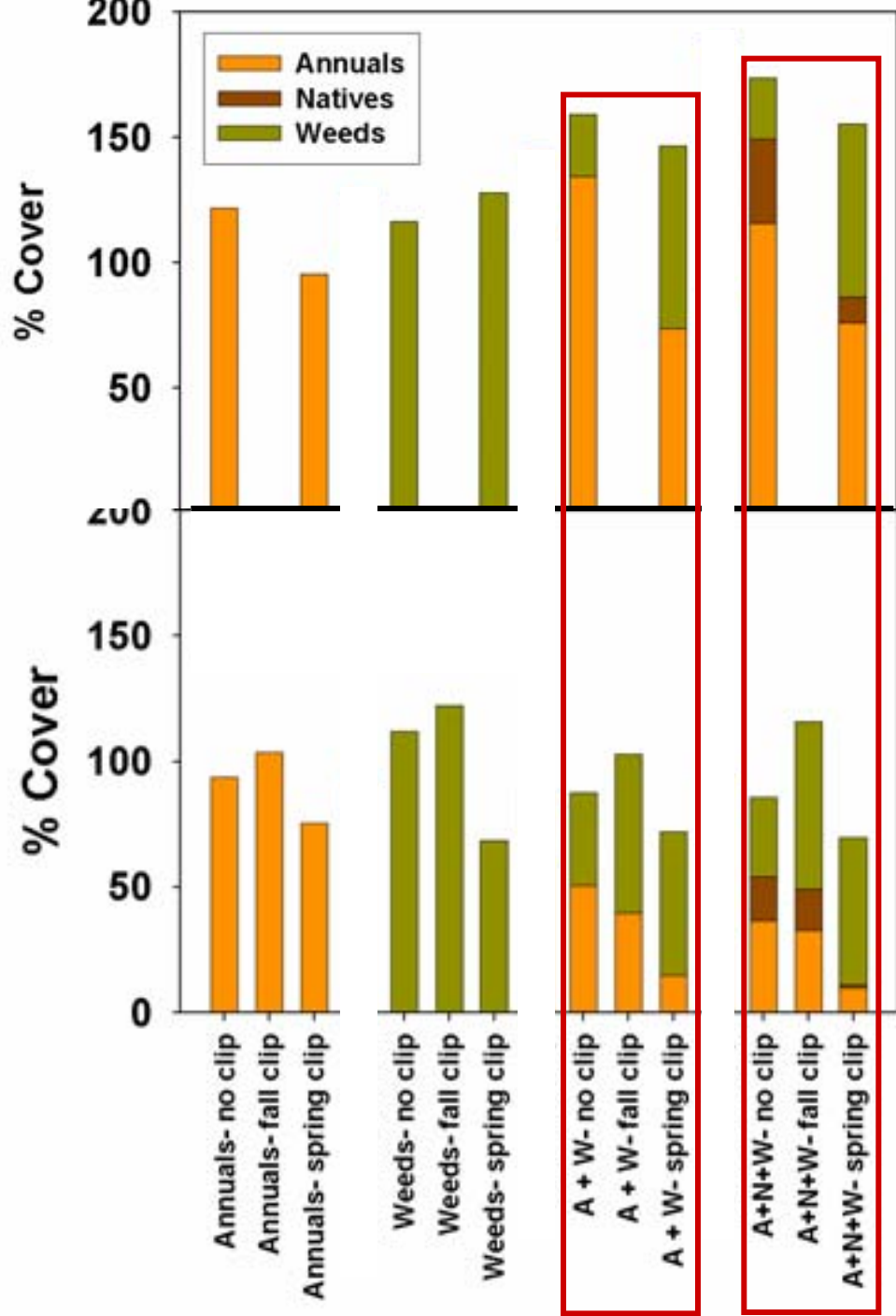


Spring 2008

Spring 2009

**Spring grazing consistently decreases annuals and natives, and increases weeds (mostly medusahead)**





Spring 2008

Spring 2009

**Fall grazing does not decrease annuals or natives. Increases weeds (both medusahead and goatgrass)**

## **Broader lessons learned: Phenology helps us understand patterns, but does not yet provide a silver bullet for managing weeds**

- Phenological overlap with a late-season annual (but not natives) seemed to be effective in controlling weeds in 1<sup>st</sup> year
  - Impacts of natives may change as longer-lived bunchgrasses establish more?
- Climate variation strongly mediates species composition and species interactions
- Grazing strongly impacts competitive dynamics between groups
  - So far have documented the timing of grazing that increases the prevalence of the invaders
  - There may be potential for short, intense grazing periods to suppress these weeds

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