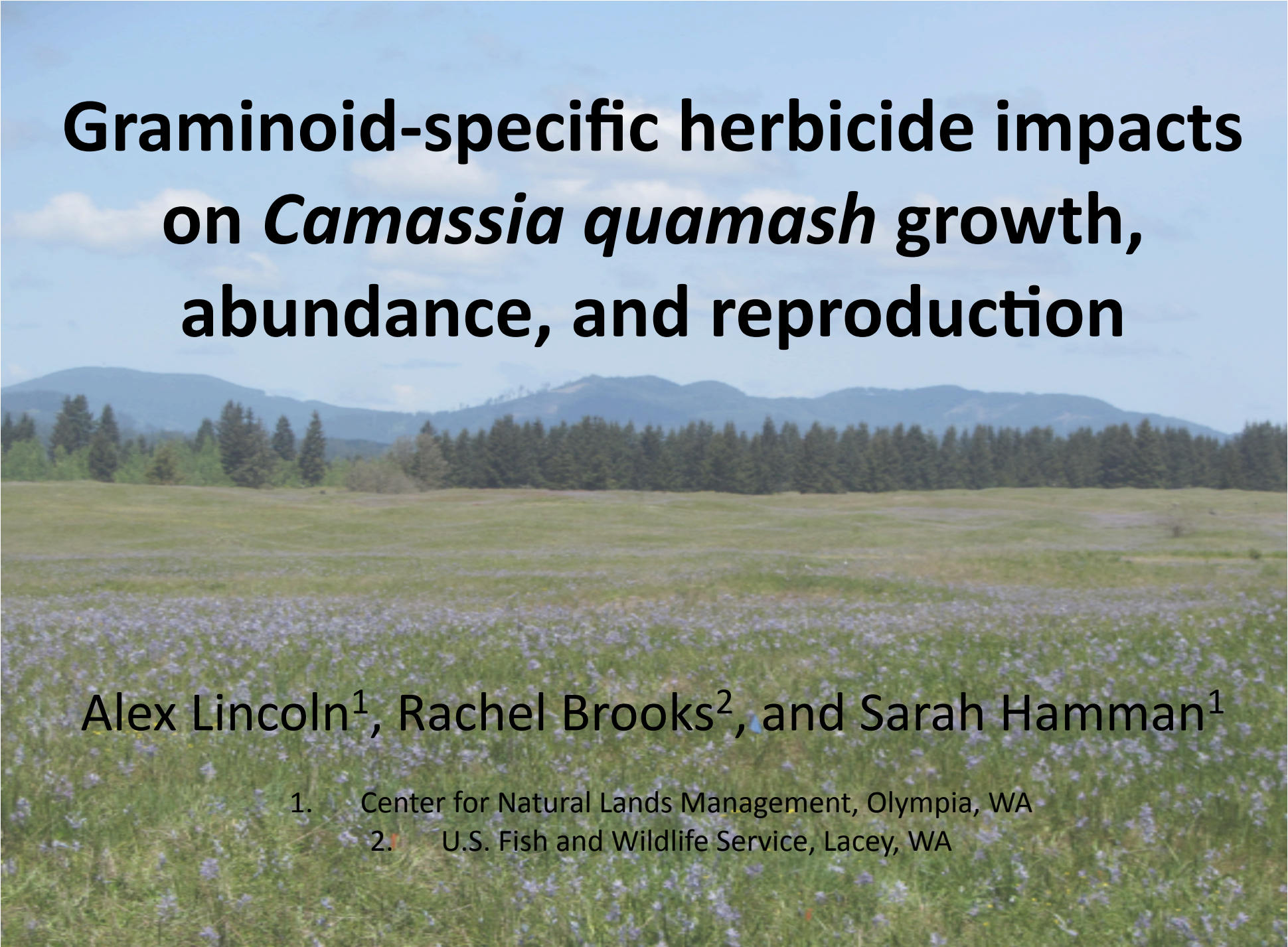




Graminoid-specific herbicide impacts on *Camassia quamash* growth, abundance, and reproduction

Alex Lincoln¹, Rachel Brooks², and Sarah Hamman¹

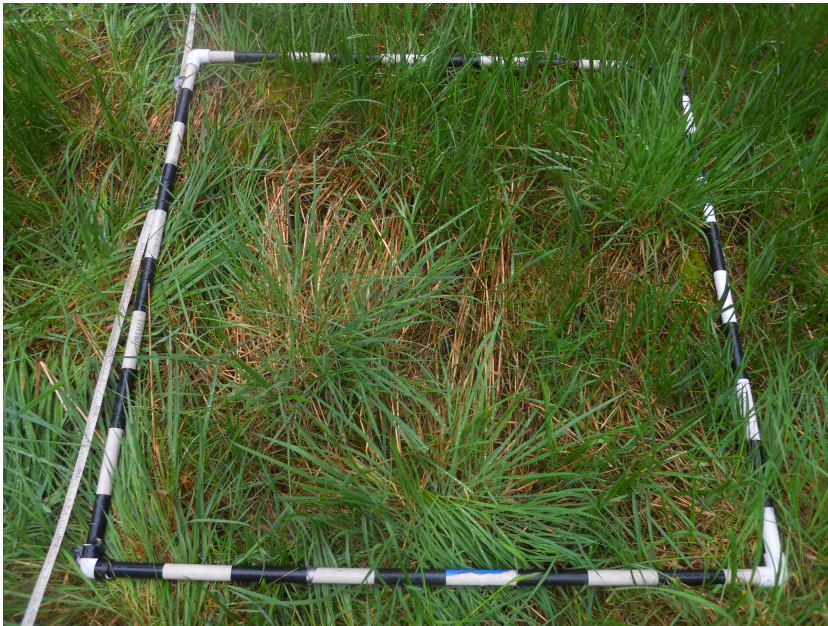
1. Center for Natural Lands Management, Olympia, WA

2. U.S. Fish and Wildlife Service, Lacey, WA

Camas in the Pacific Northwest



Restoration efforts in the South Sound

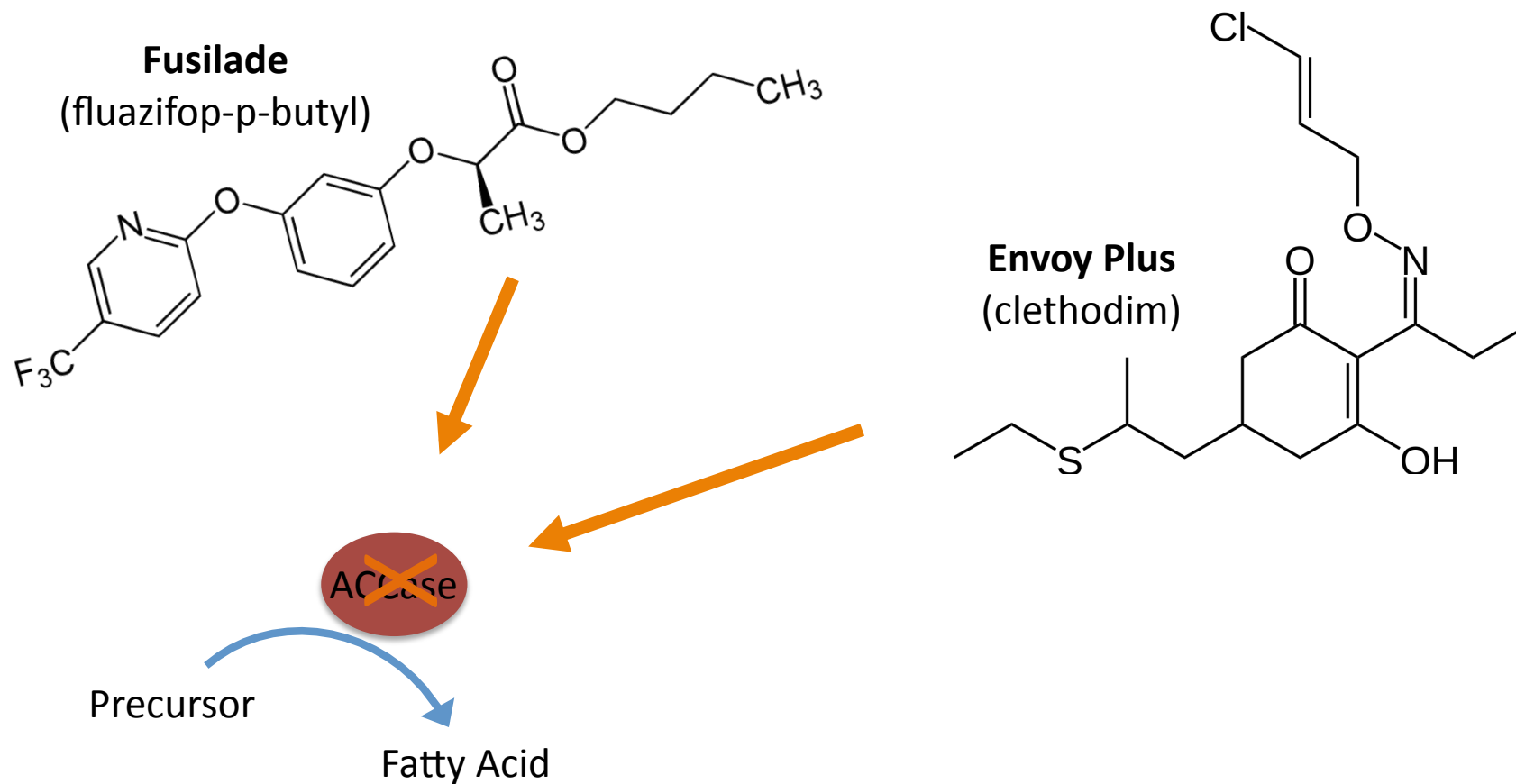


Before

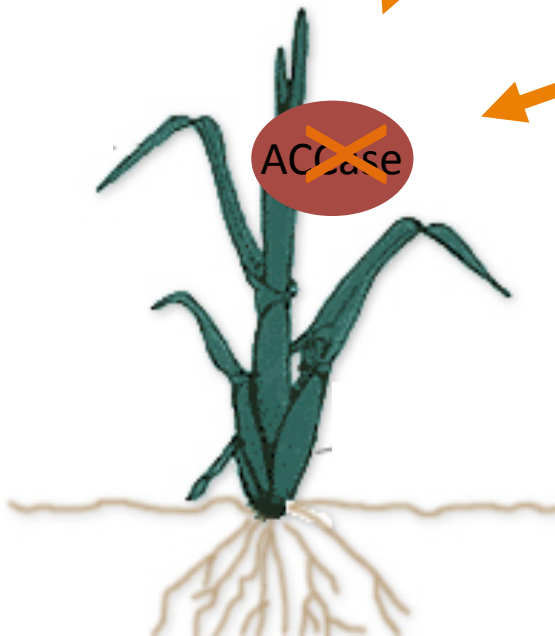
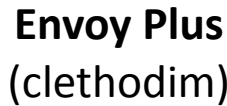
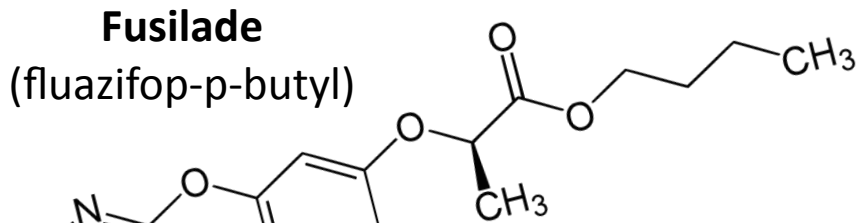


After

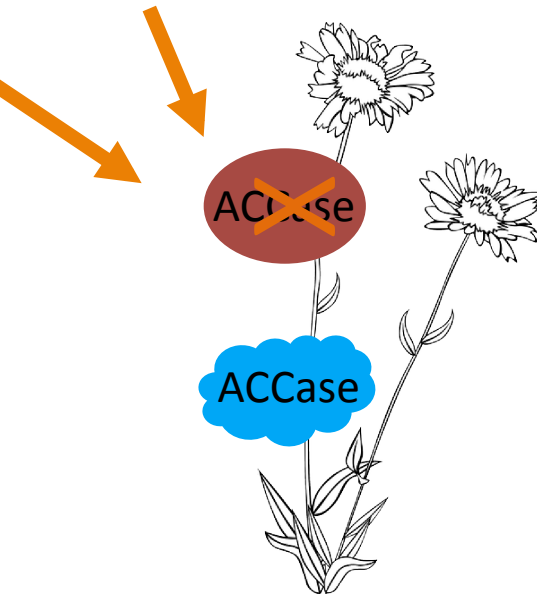
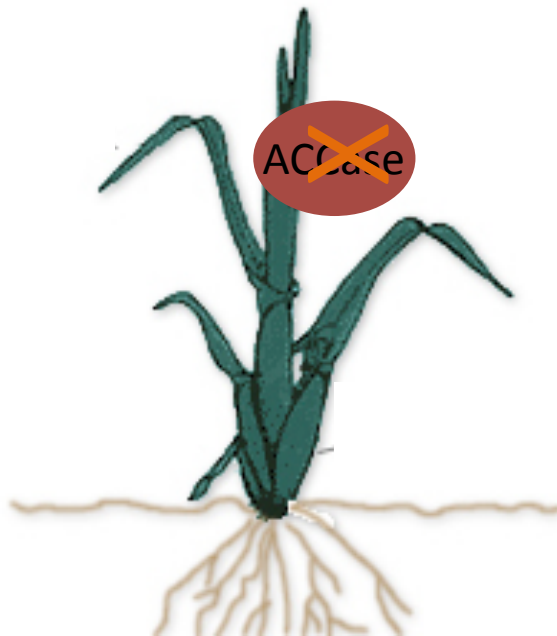
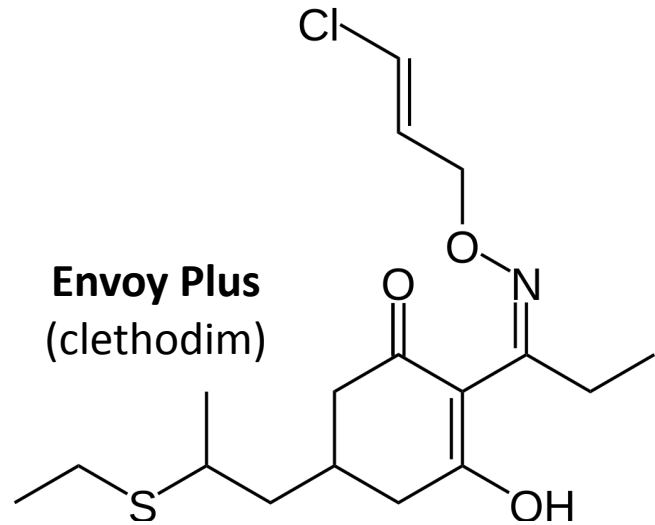
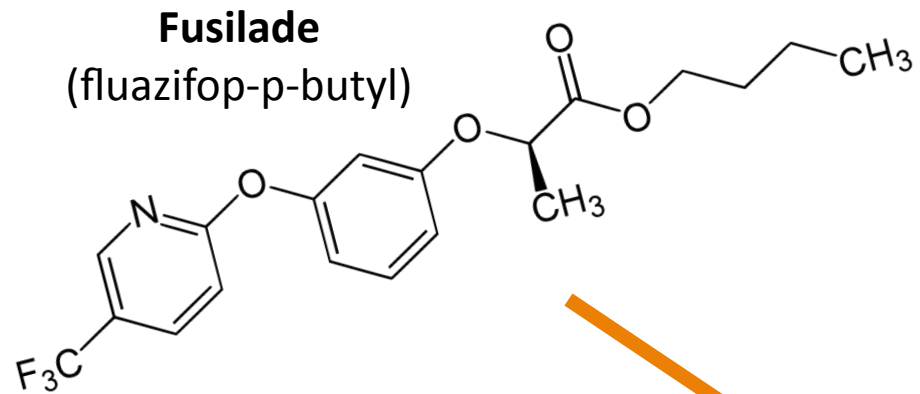
Fusilade and Envoy Plus



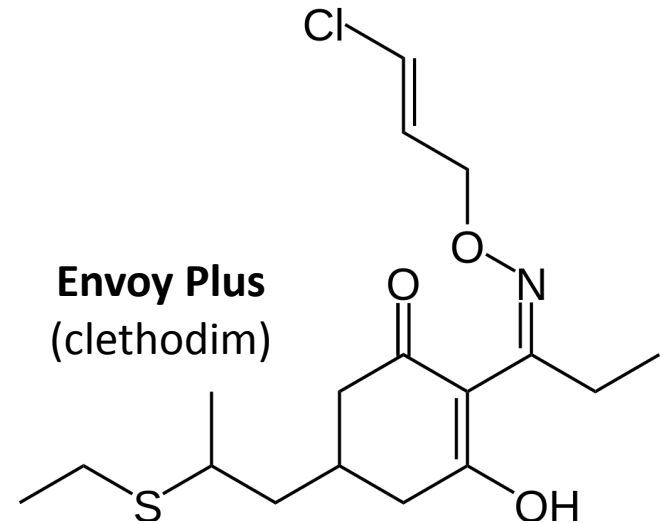
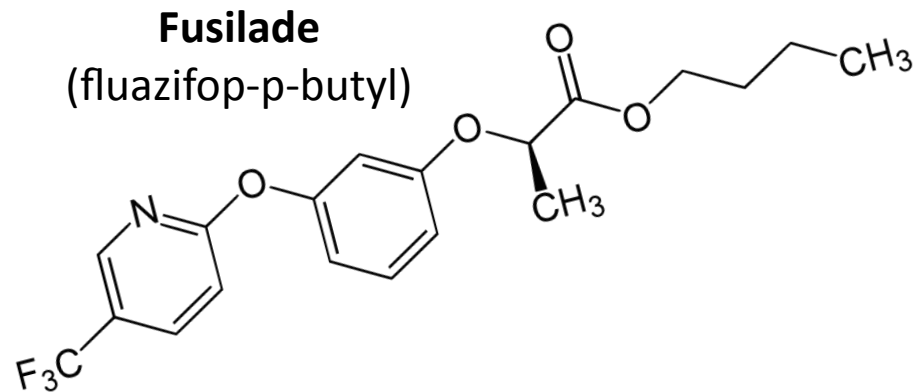
Fusilade and Envoy Plus



Fusilade and Envoy Plus



Fusilade and Envoy Plus

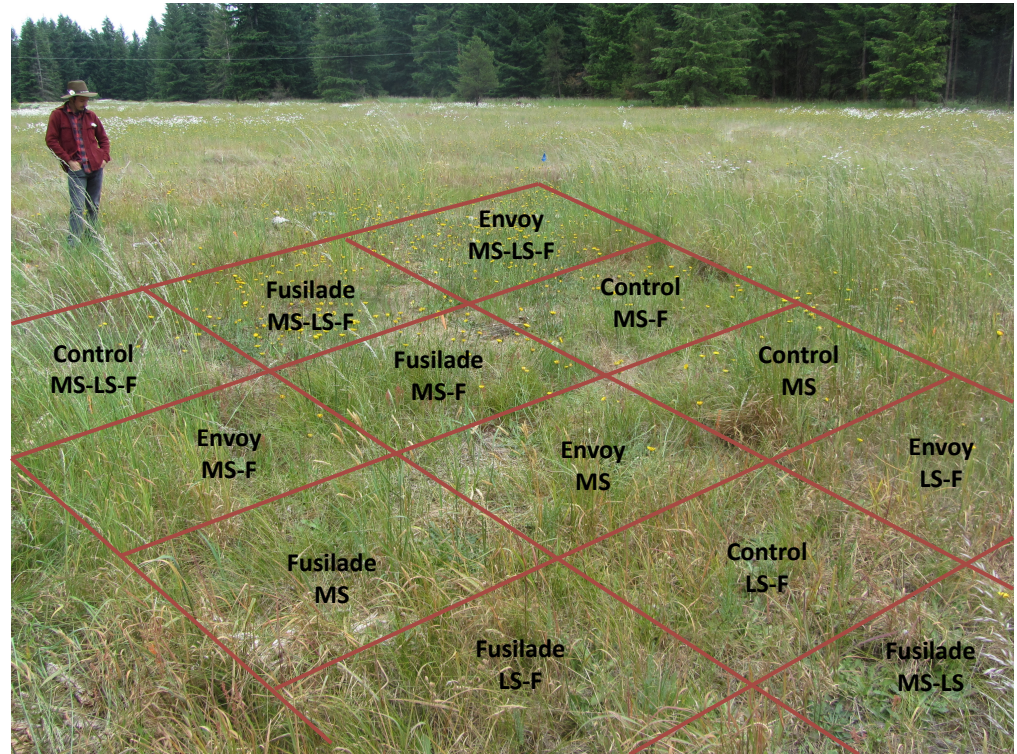


Q: Do graminoid-specific herbicides
affect the growth, abundance,
or reproduction of common camas?

Treatments

- Season-frequency

- Mid-spring (MS)
- Late spring (LS)
- MS-LS
- MS-F
- LS-F
- MS-LS-F



- Herbicide

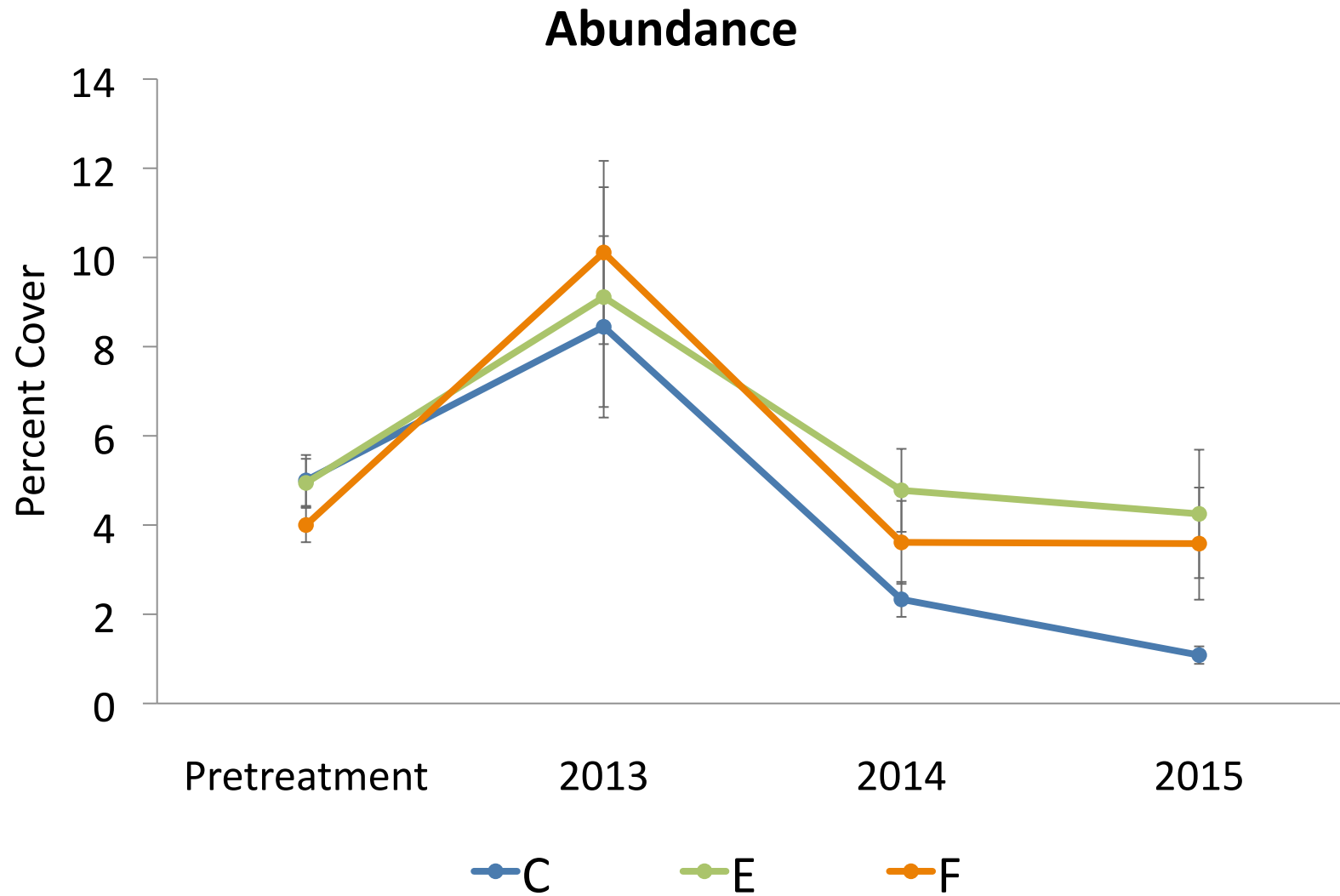
- Fusilade (0.75% Fusilade, 0.25% Nufilm. Half life = 1-2 weeks)
- Envoy Plus (0.5% Envoy Plus, 0.25% Nufilm. Half life = 3 days)
- Control (water)

Measures

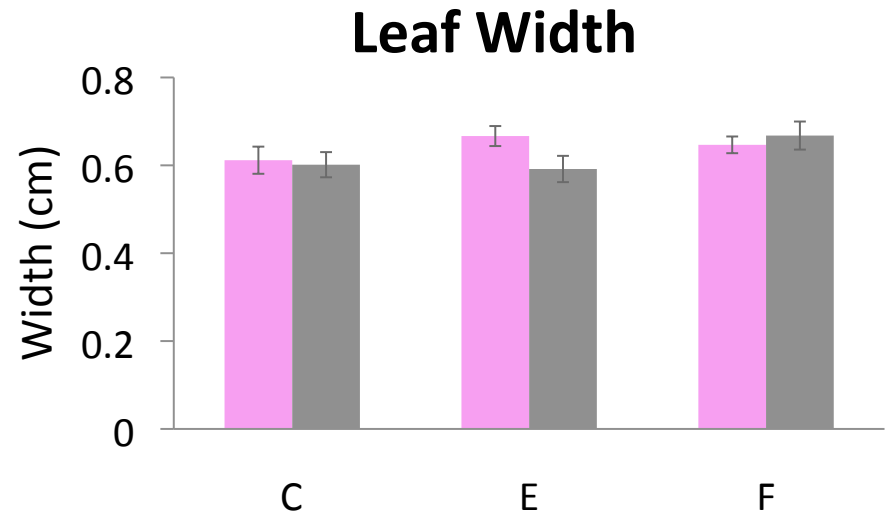
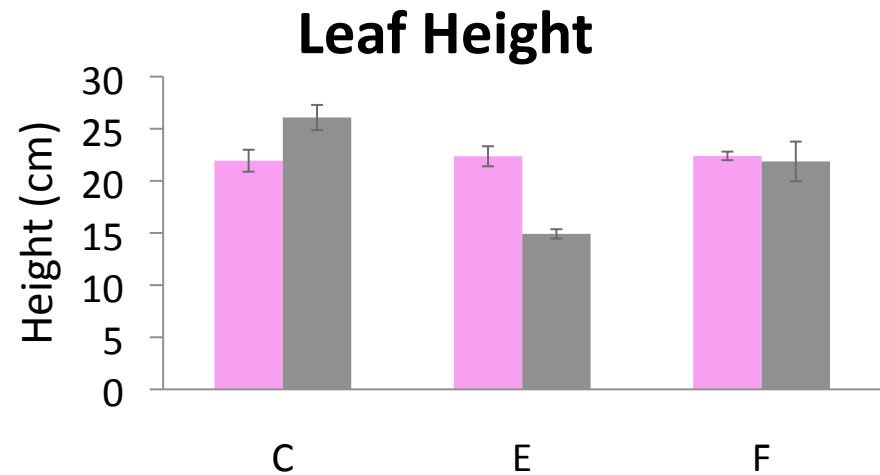
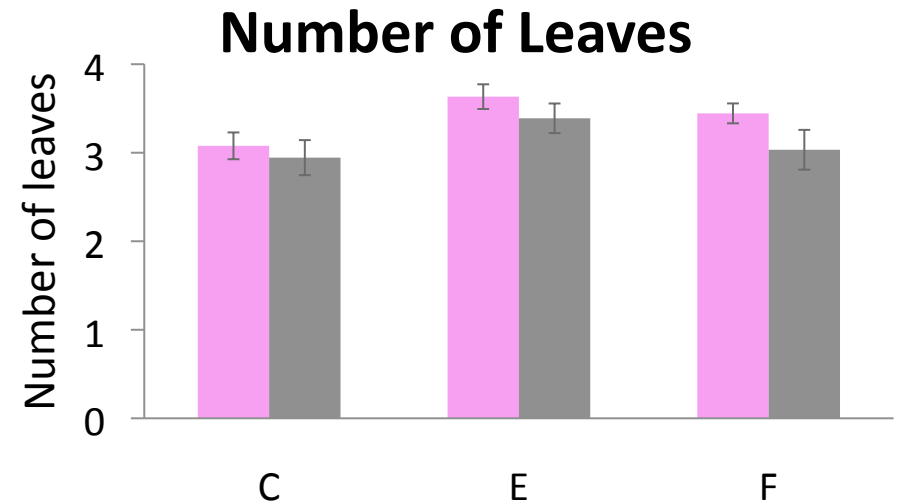
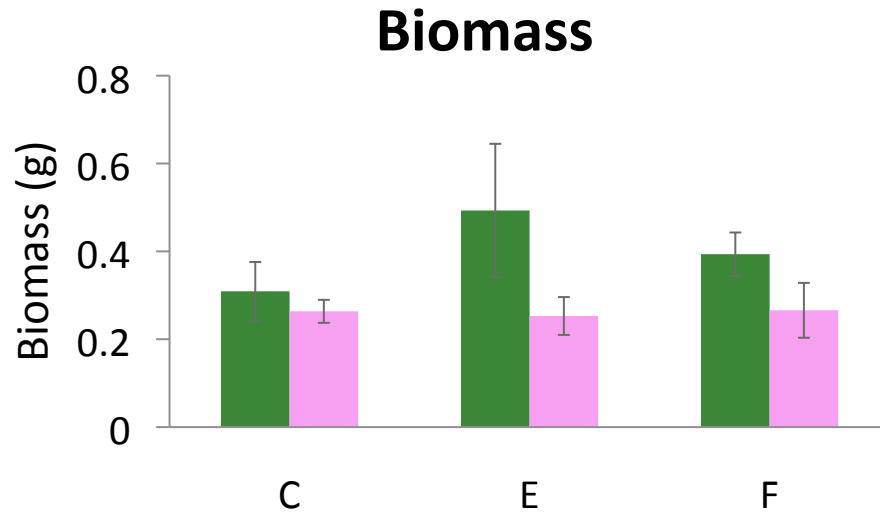
- Abundance
 - Percent cover
- Growth
 - Biomass
 - Leaf height and width
 - Number of leaves
- Reproduction
 - Number of flowers, seeds, seedpods
 - Seed viability
 - Seedpod success



Treatment does not affect abundance

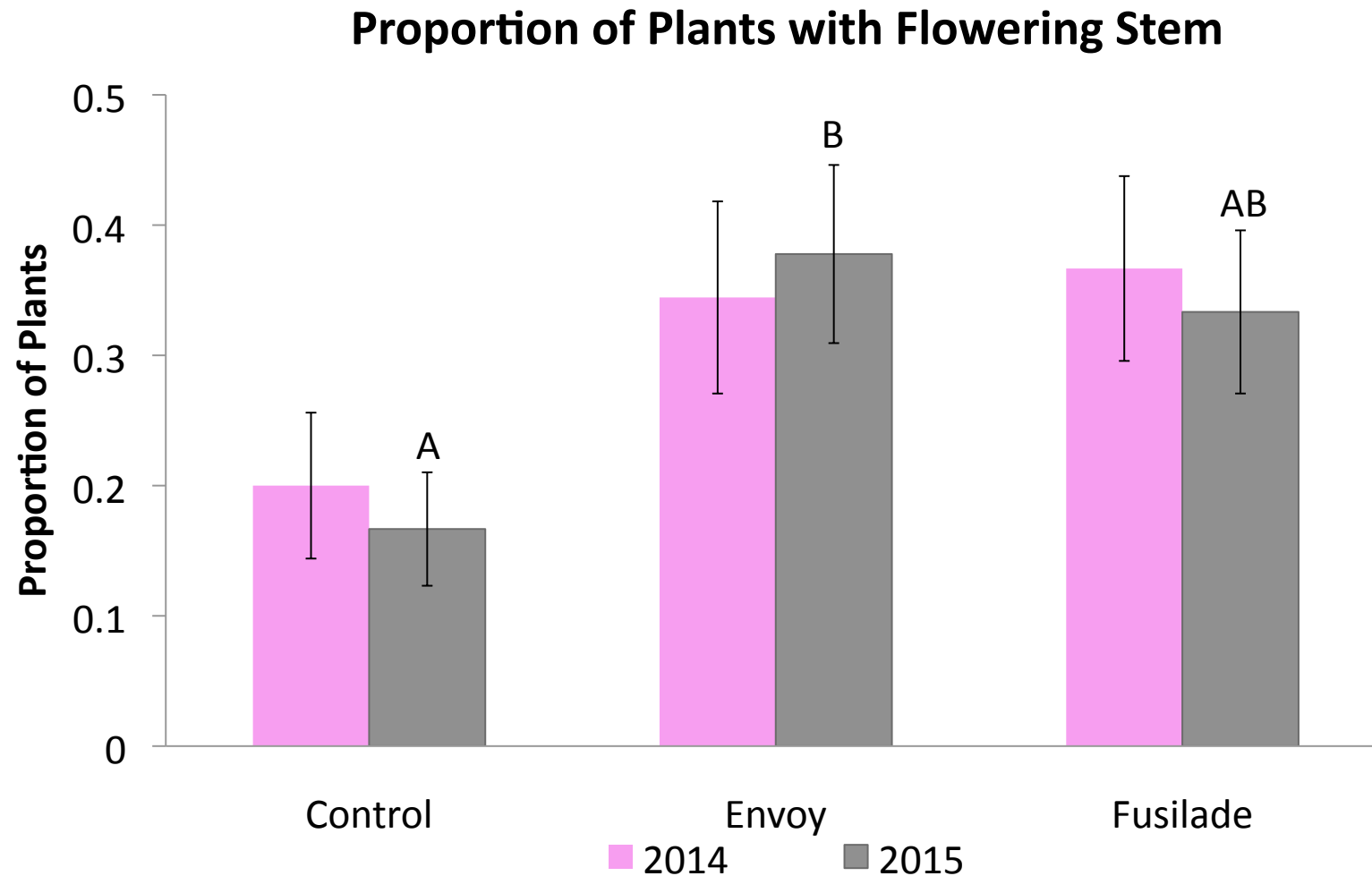


Treatment does not affect growth



■ 2013 ■ 2014 ■ 2015

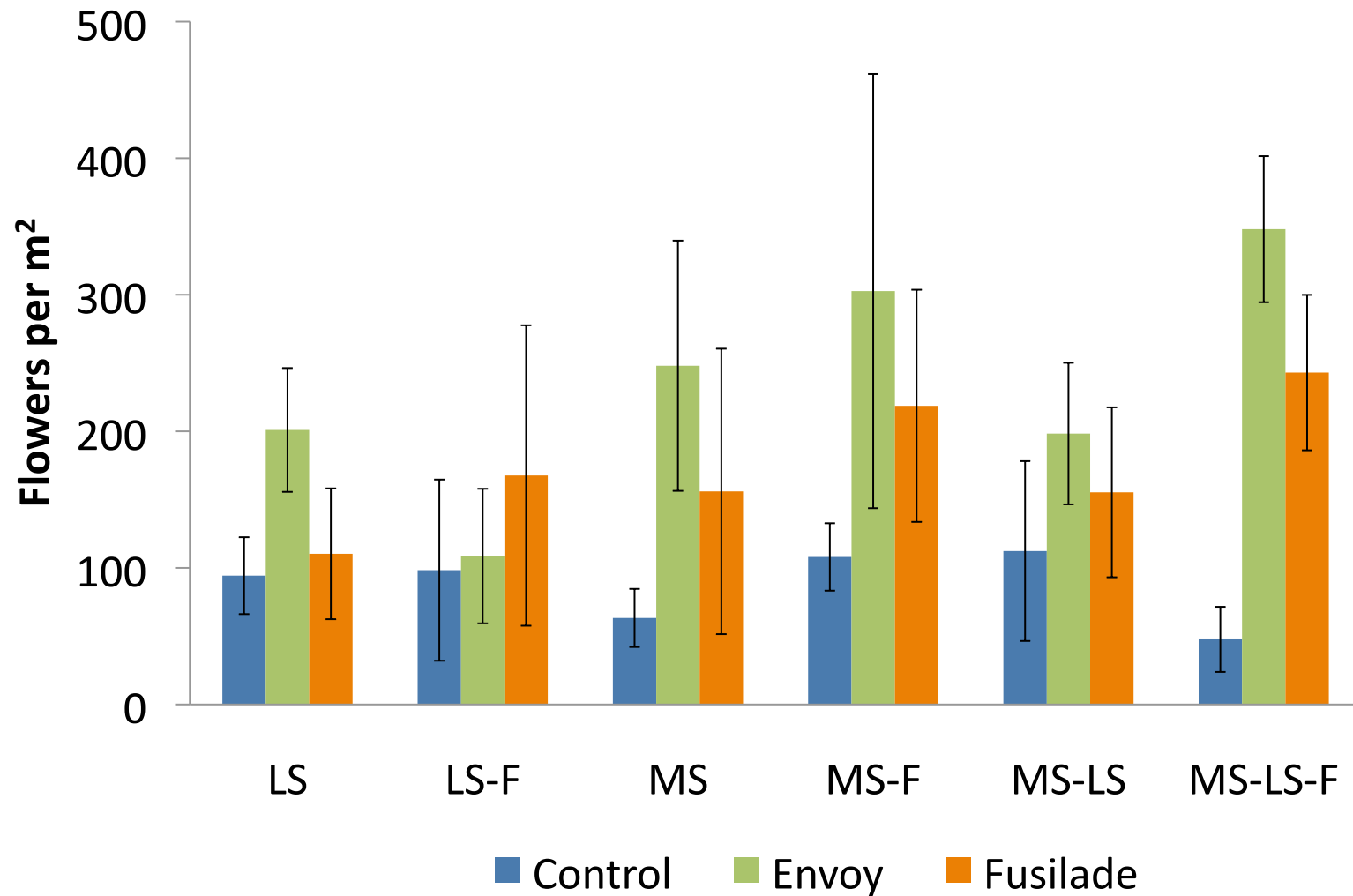
Treatment may indirectly enhance stem production



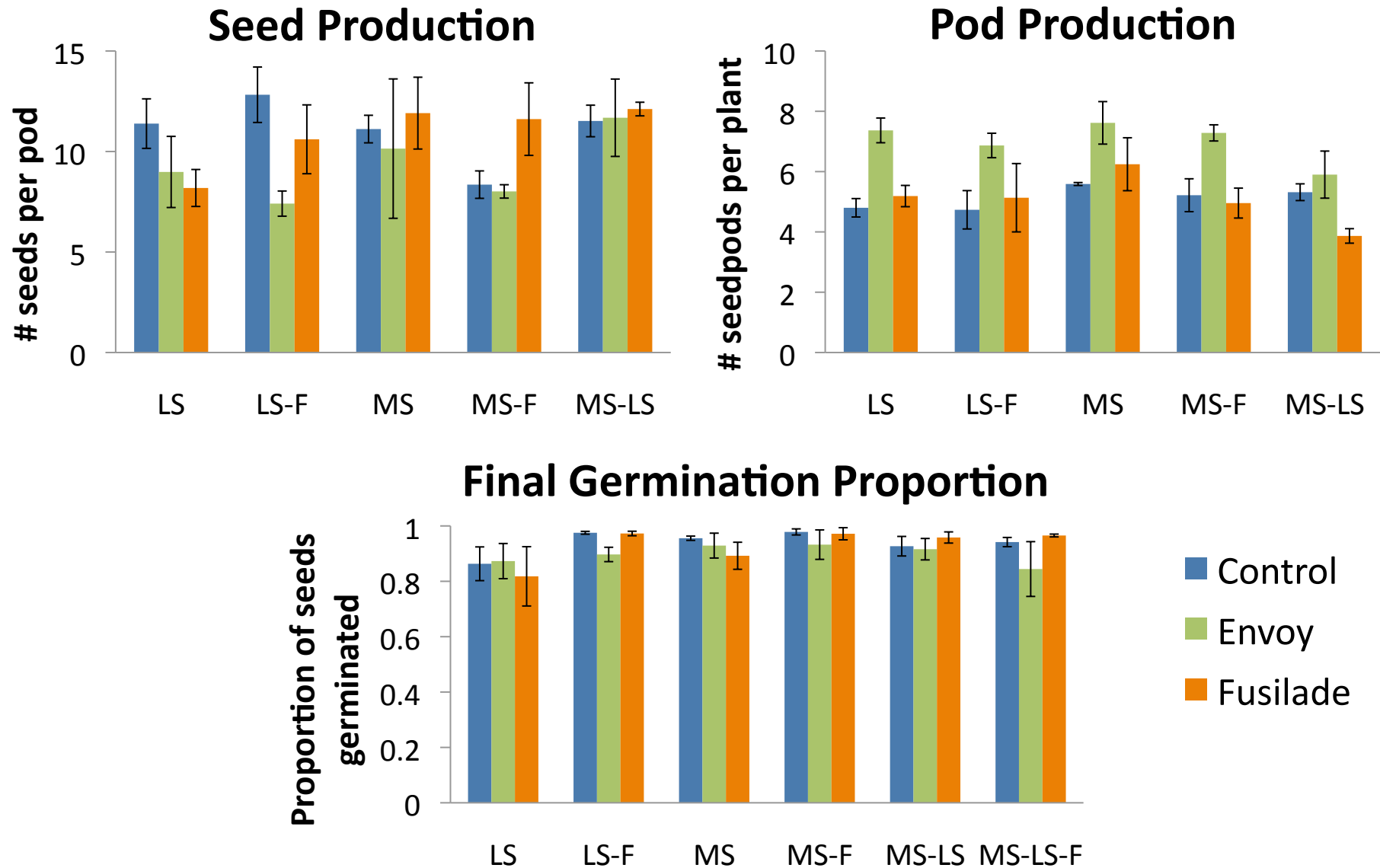
- Stem production is increased in plots with herbicide treatment

Treatment does not affect reproduction

Flower Production 2015

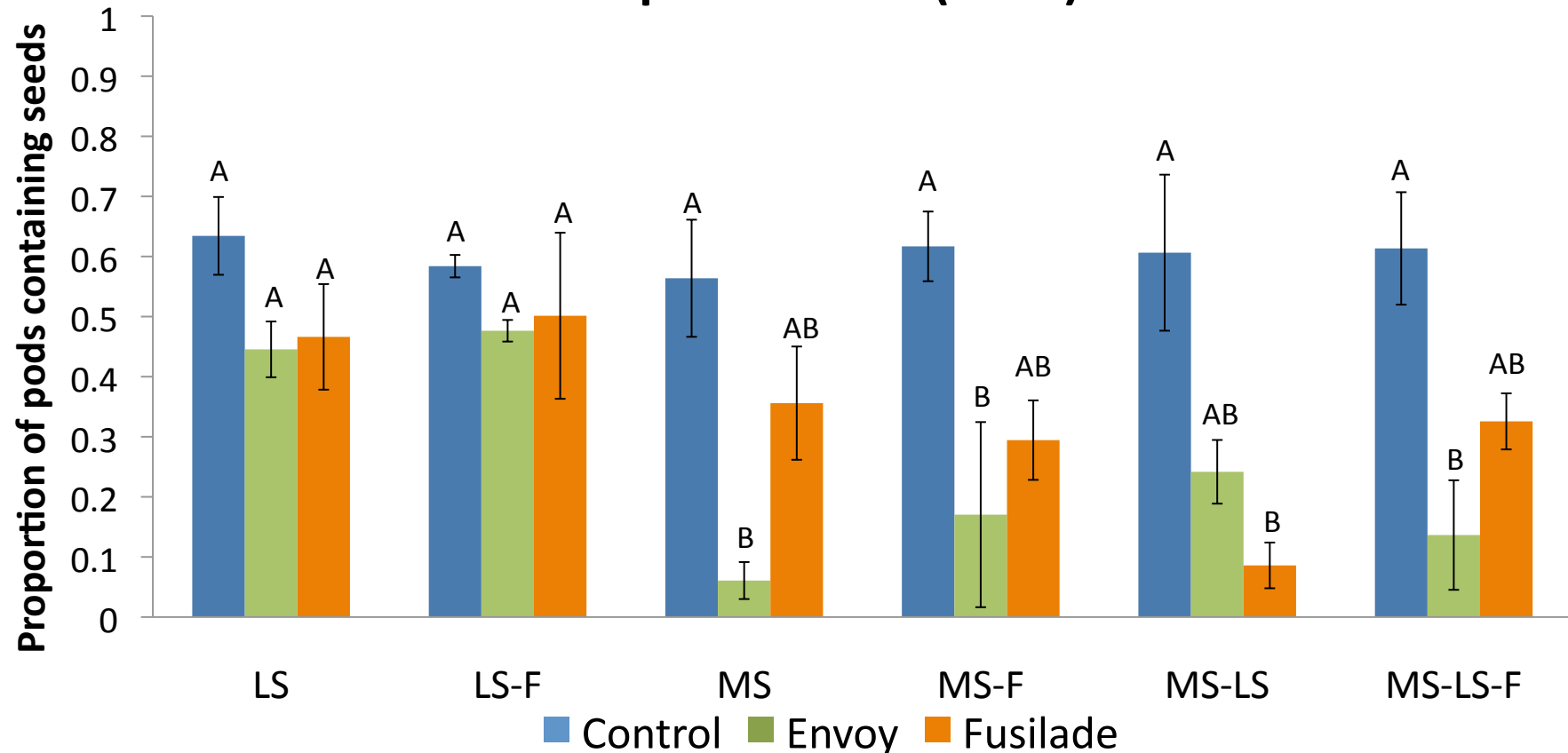


Treatment does not affect reproduction



Treatment does not affect reproduction except...

Seedpod Success (2014)



- Seedpod success is decreased in plots with mid-spring herbicide treatment

Implications and Management Recommendations



- Envoy Plus and Fusilade should not affect camas when used at recommended concentration

Questions?

