

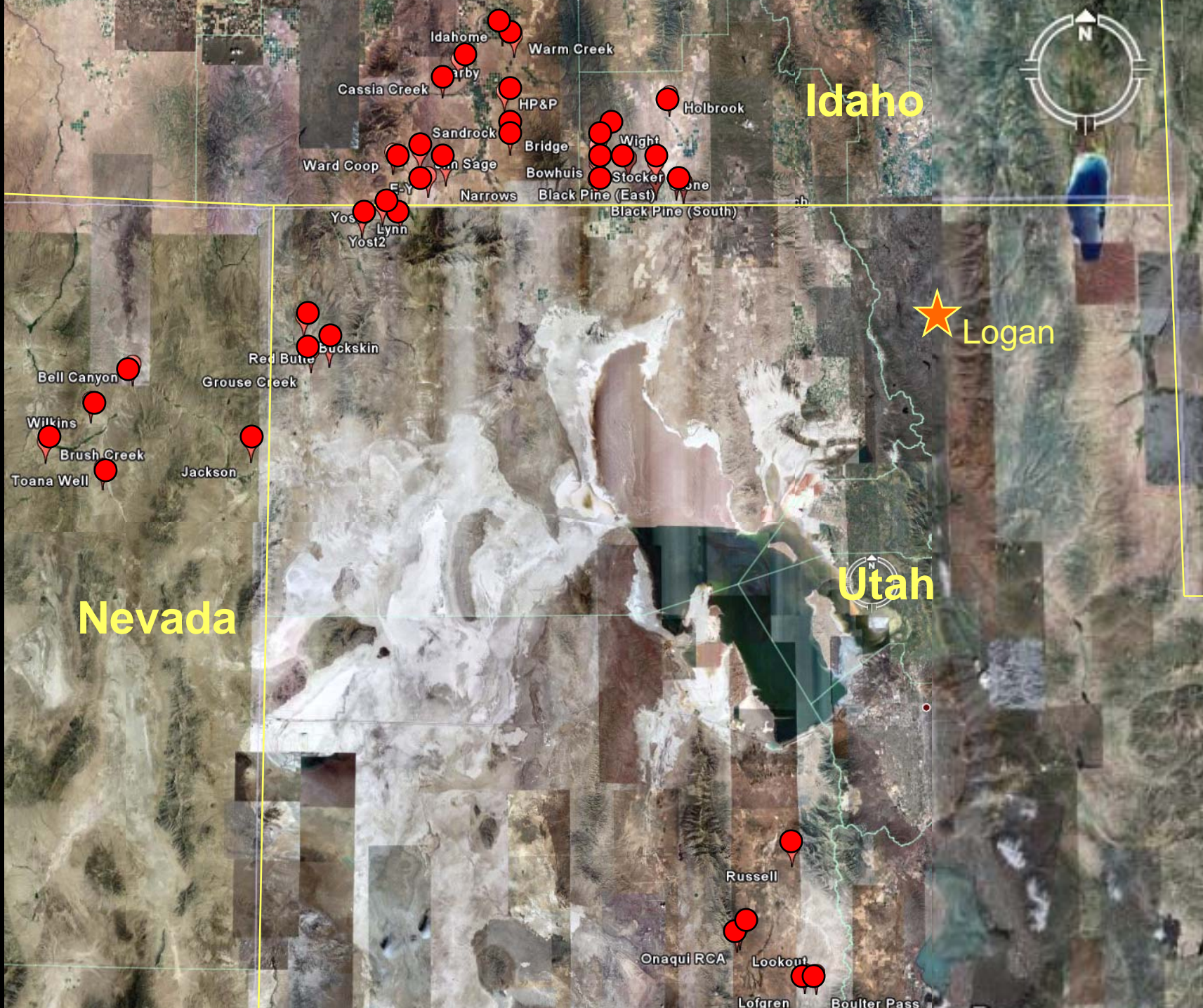
What makes a community susceptible to weed invasion?

Characteristics of invasive species

Characteristics of ecosystem

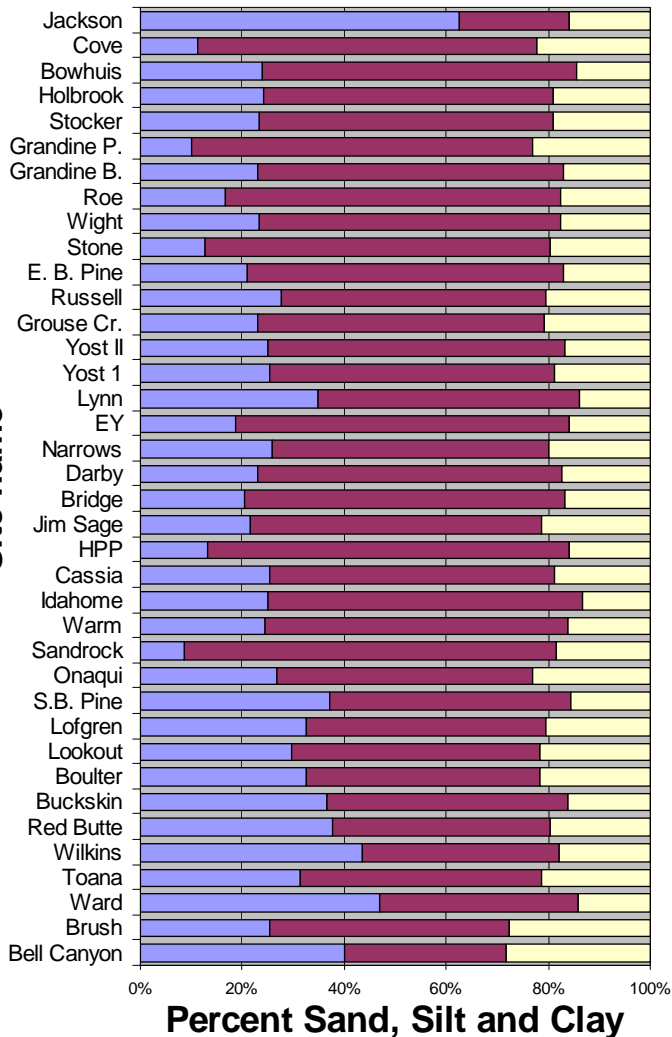
Relationship between invasive species and ecosystem
e.g., lock and key models (Heger and Trepl 2003)





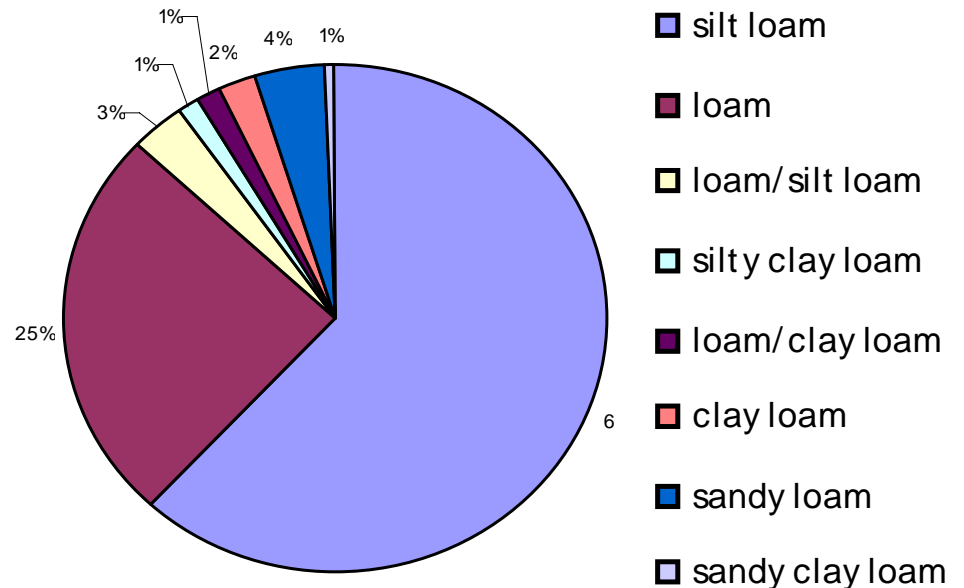
Soil Texture

**Mean particle size distribution
(soil texture) per site**

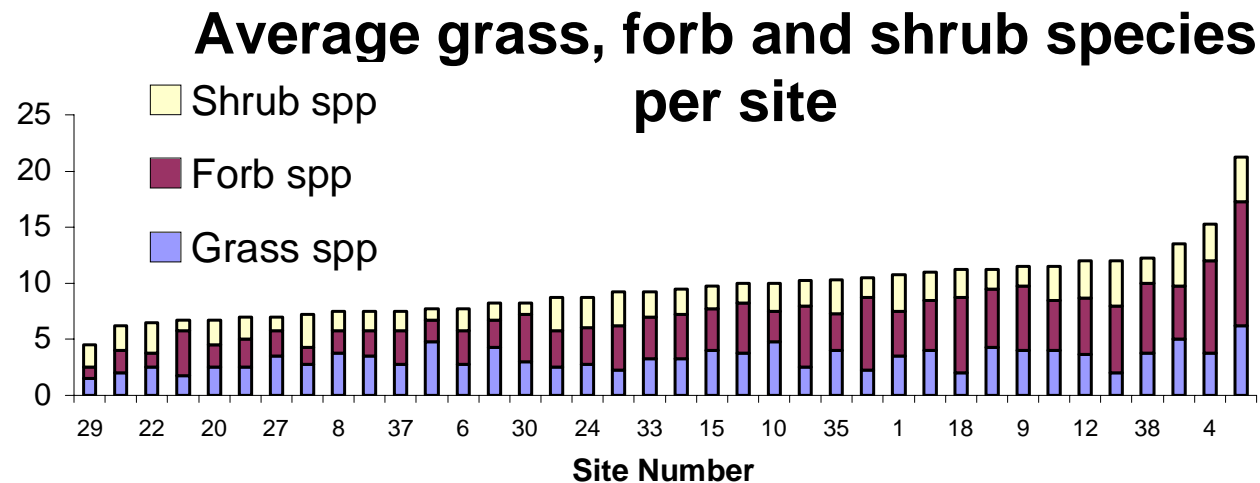


Soil texture varies widely among sites, though 90% are loam or silt loam.

Texture Class Distribution



Vegetation Diversity



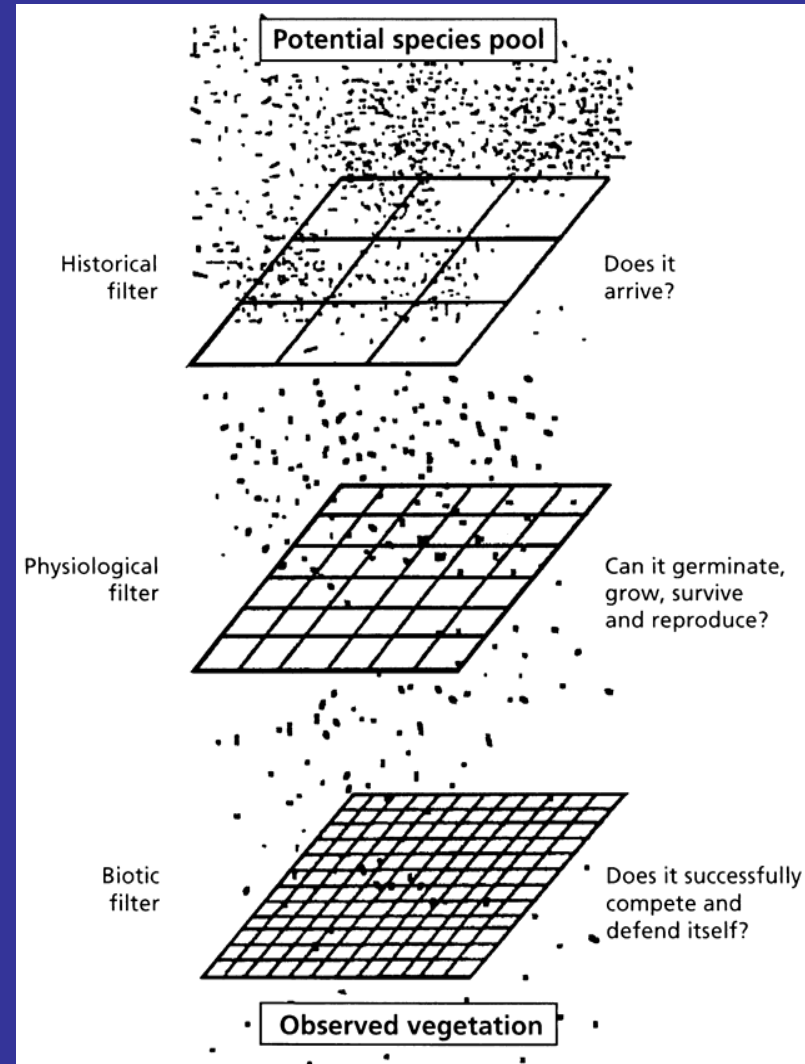
What combinations of plant materials are best to resist weed invasion?

Tom Monaco and Eamonn Leonard



Objective

- *Evaluate the effect of species, growth form, and disturbance on weed resistance.*



• Research Questions

1. Does a mix of three morphologically distinct growth forms provide greater weed resistance than a single species ?
2. Is resistance to invasion greater in plots that contain species of same growth form as the invader?
3. Does disturbance similarly facilitate invasion in grass, forb, and shrub plots?



Study site:

Millville, in northern UT, Cache County - Soil at this site is a Ricks gravelly loam series.

Established 600 plots in 2003

Mixes and monocultures of 12 species in 20 combinations



7 plot types used in this experiment

Low and high diversity plots containing:

Grasses

Forbs

Shrubs

Mix of all 3

30 replicates of each plot type arranged in a completely randomized design (240 total plots).



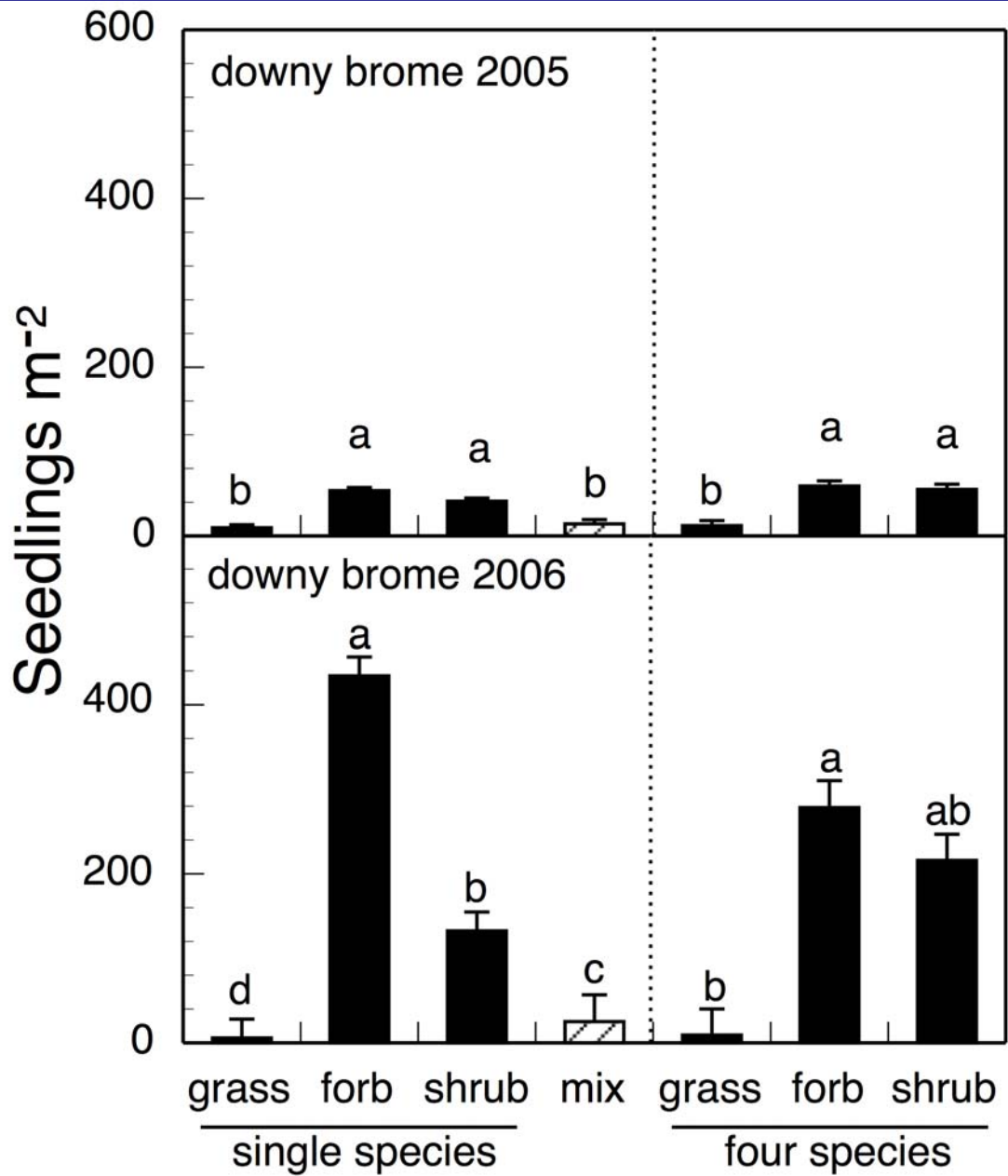
Disturbance and introducing weed seed

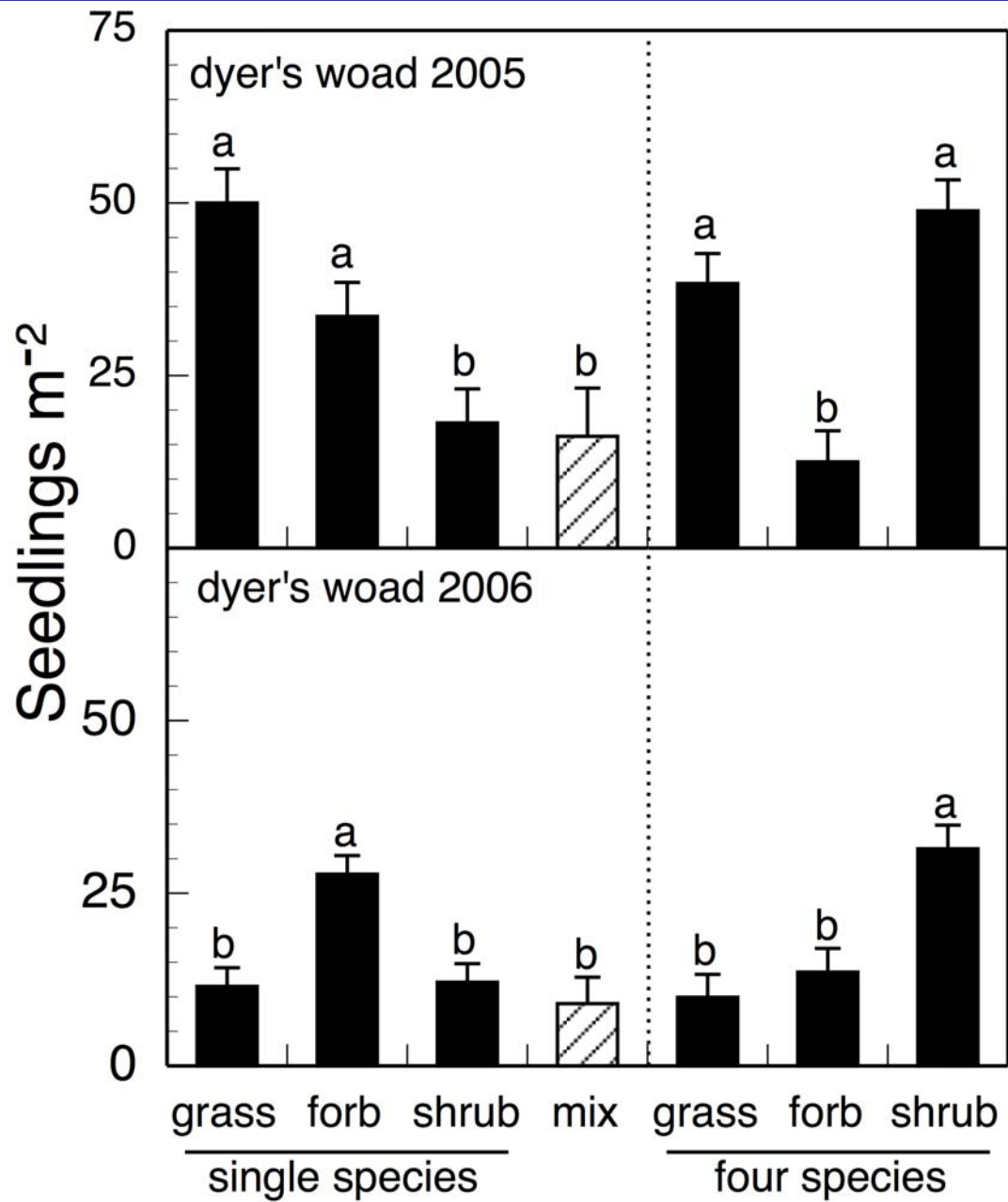
Removed 4 plants in Fall 2004 (low-diversity only)

Added seed of *Bromus tectorum* and *Isatis tinctoria* (~400 seeds/species) in November 2004 and 2005.

Density of weeds evaluated in Summer 2005 and 2006).

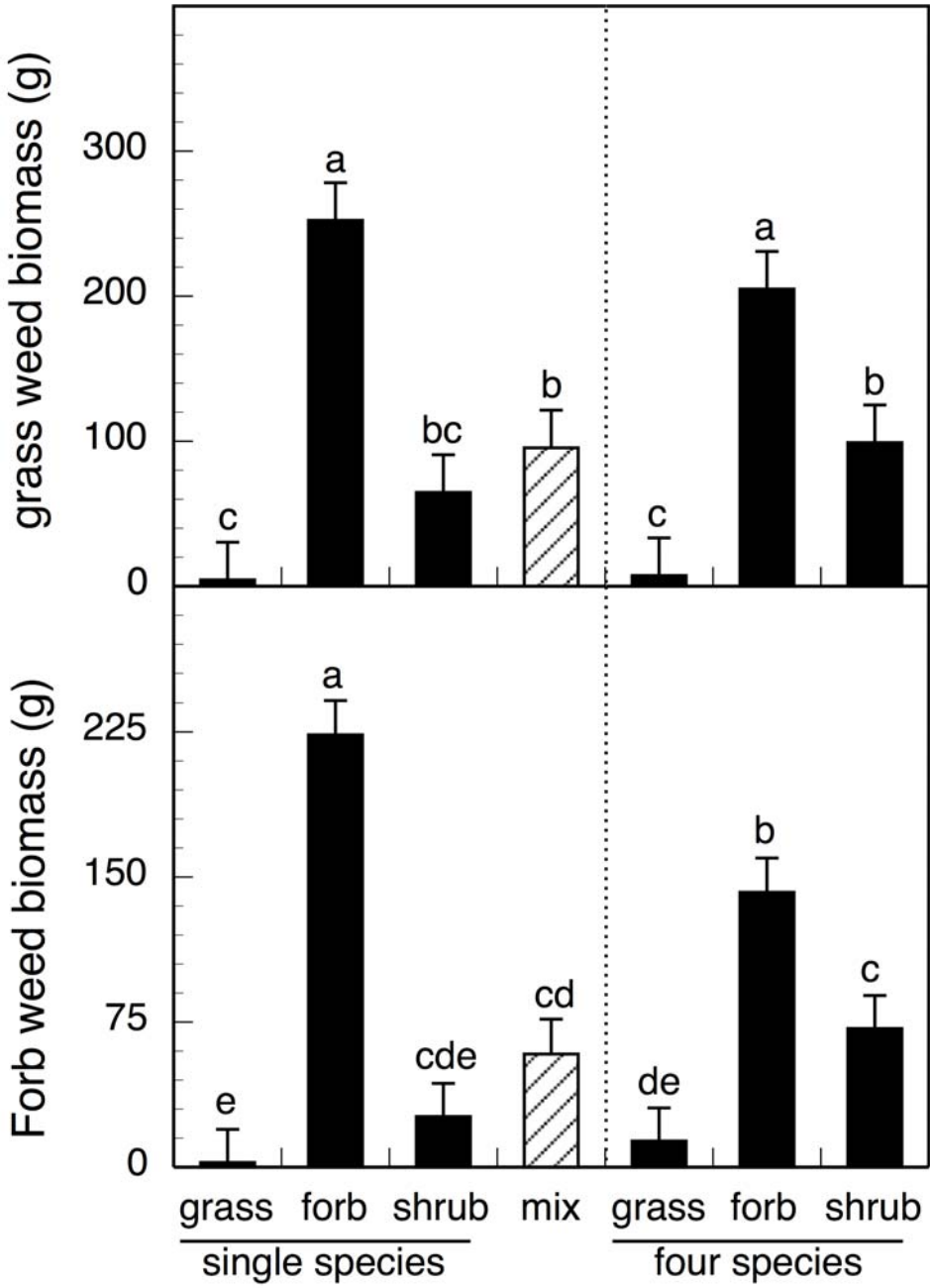






Disturbance similarly increased invasion in grass, forb, and shrub plots.

		Seedling density	
		2005	2006
	Treatment		
Downy brome	Intact	28 b	139 b
	Disturbed	47 a	230 a
Dyer's woad	Intact	17 b	11 b
	Disturbed	51 a	23 a



- **Conclusions**

1. Does a mix of three morphologically distinct growth forms provide greater weed resistance than a single species ?

No - grass plots best resisted weed emergence

2. Is resistance to invasion greater in plots that contain species of same growth form as the invader?

Yes, but only for downy brome

3. Does disturbance similarly facilitate invasion in grass, forb, and shrub plots?

Yes

Acknowledgments

We thank Justin Williams, Kevin Connors, Lowell Gardner, Travis Taylor, Tonya Shoemaker, Kevin Gunnell, and Jamin Johanson for assisting with field research.

