An Investigation of Intraspecific Variation of Bolboschoenus Maritimus (Alkali Bulrush)

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Alkali bulrush is a keystone species for migratory birds

Kettenring et al. 2018
Why care?

*Phragmites australis* monotypic stand

Post *P. australis* treatment

Kettenring et al. 2012, Marty and Kettenring 2017
Inform Wetland Restoration Managers
Alkali bulrush traits vary between ecotypes
Hypothesis

Traits between different ecotypes will be different and traits within ecotypes will be similar.
Ecotype Locations

FO: Freeze Out Lake, MT
BL: Bear Lake Wetlands, ID
PSG: Public Shooting Grounds, UT
BR: Bear River Migratory Bird Refuge, UT
CL: Clear Lake, UT
Five replicates per ecotype
Common Garden Experiment

Above Ground Traits:
• Above ground biomass
• Maximum Vegetative Height
• Average height
• Stem count
• Inflorescence count

Below Ground Traits:
• Below ground biomass
• Stems per tuber
• Nodes per tuber
• Root biomass per tuber
alkali bulrush
below ground structure
Statistical analysis

Levene’s test: p-value $> 0.05$ for all traits

Variation is equal between ecotypes for each trait
Statistical analysis

Generalized Linear Model

- Akaike’s Information Criterion (AIC) to find the best fit model
Statistical analysis

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Generalized Linear Model

* P-value < 0.05 The variable has an effect on the ecotype

Model 3
- Above Ground Biomass *
- Below Ground biomass  
- Proportion of stems to tubers *
- Stem count *

Model 8
- Proportion of nodes to tubers *
- Root biomass per tuber *
- Maximum vegetative height 
- Inflorescence count *
- Average height
Pairwise comparison
Variable traits

High biomass and inflorescence count
Greater production, reproductive potential, and crowding resistance

Lower biomass and inflorescence count
Lower production, reproductive potential, and crowding resistance

High nodes per tuber
High crowding resistance

Lower nodes per tuber
Lower crowding resistance

Stems per tuber = 1
High production and crowding resistance

Stems per tuber = 0.25
Lower production and crowding resistance

Moore et al. 2017
Conclusion and Implications

• Plants from different ecotypes have **variable traits** for
  • Crowding resistance
  • Productivity
  • Spread
  • Reproductive potential

• Inform **managers** on restoration of alkali bulrush

• Inform **researchers** on methods to analyze below ground traits of wetland plants
Thank you Karin Kettenring, Trisha Atwood, and Rachel Chamberlain for your support and contributions!
Questions?
Citations


