THE FORAGE AND RANGE RESEARCH LABORATORY

Forage and Range Research Laboratory

Evaluation of a Native Prairie Junegrass collection from Eastern Oregon for Use in the Great Basin

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Who are we?



Our Mission

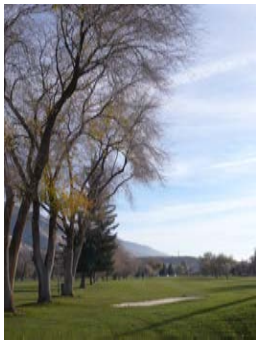
Provide improved plant materials and management alternatives for sustainable stewardship of rangelands and pastures in the western U.S.

Range
Ecology
Breeding

Pasture
Breeding
Culture

Plant Genetics (6)
Molecular Biologists (4)
Physiologist (1)
Ecologist (1)

Turf
Breeding



Biomass
Breeding

What We Do: Plant Breeding

Breeding Strategy

One Breeding Cycle =3 years

Plant Introduction

Plant collection or acquisition

Trait Evaluation

Crossing

Selection

2-3 cycles + Seed Production = 10-15 years

Improved Plant Material

What is the problem?

Wildfires

- ❖Cerro Grand Fire in NM in 2000 (48,000 acres, $800 million in damages)
- ❖Rodeo-Chediski Fire in AZ in 2002 (150,000 acres, $300 million in damages)
- ❖Milford Flat Fire in NV/UT in 2007 (366,000 acres, $37 million in damages)
- ❖Southern Nevada Complex in NV and UT (739,037 acres, no $ assessment)

General Ecosystems: Mojave Desert Example

Low elevation shrubland

Middle elevation shrubland

High elevation shrubland

Brooks & Minnich (2006)

Increasing Fire Resiliency

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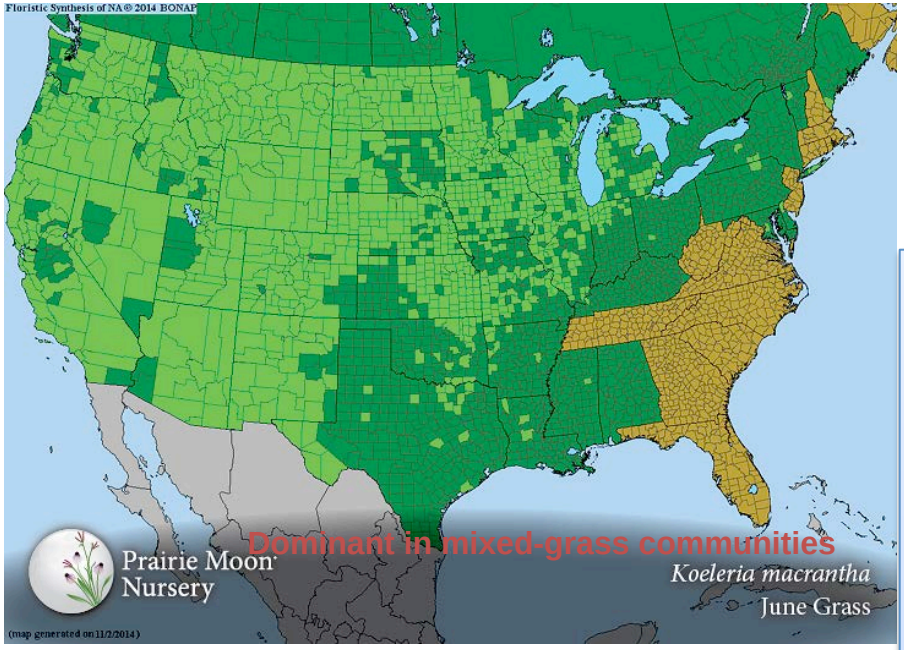
PLANTS FOR THE WEST

Prairie Junegrass: A Solution?

Native US *Koeleria macrantha* Distribution



- Cosmopolitan among grassland habitats
- 5,000 to 8,000 feet
- Cool, semi-arid, infertile soils & rocks
- 16-20 inches annual precipitation
- Steep slopes & well-drained soils
- Exchangeable Na (+)
- Sandstone & high exchangeable K (-)

Nutritional Value

	Dry	Green
Crude Fiber (%)	34.2	25.8
Protein (%)	9.1	23.8

Fs.fed.us

Agronomic Characteristics

- Drought tolerant (+)
- Highly palatable (+)
- Invasive annual suppression (+/-)
- Revegetation under disturbance (+)
- Clonal propagation (+/-)
- Direct seeding (+/-)
- Seedling transplantation (+/-)
- Grazing (+/-; spring & fall +)
- Mycorrhizal associations (+ early)
- Seed (small, low viability)
- Germination (0-12 bars) & emergence (65^{o}F)

Prairie Junegrass: A Solution?

Fire Ecology

Praire Junegrass considered a superior fire-resilient bunch grass in E. OR

- **Little or no damage to moderate damage from fire (ecosystem +/-)**
- **Possesses insulated growing points near or below soil surface**
- **Small stature and course textured foliage > meristem protection**
- **Course textured foliage and small tussock size < fire damage**
- **Course grasses burn quickly, transferring < heat below soil surface**
- **Fire survival based on seed germination & residual plant survival (+/-)**

Prairie Junegrass
Slender wheatgrass
Mountain brome
Three awn

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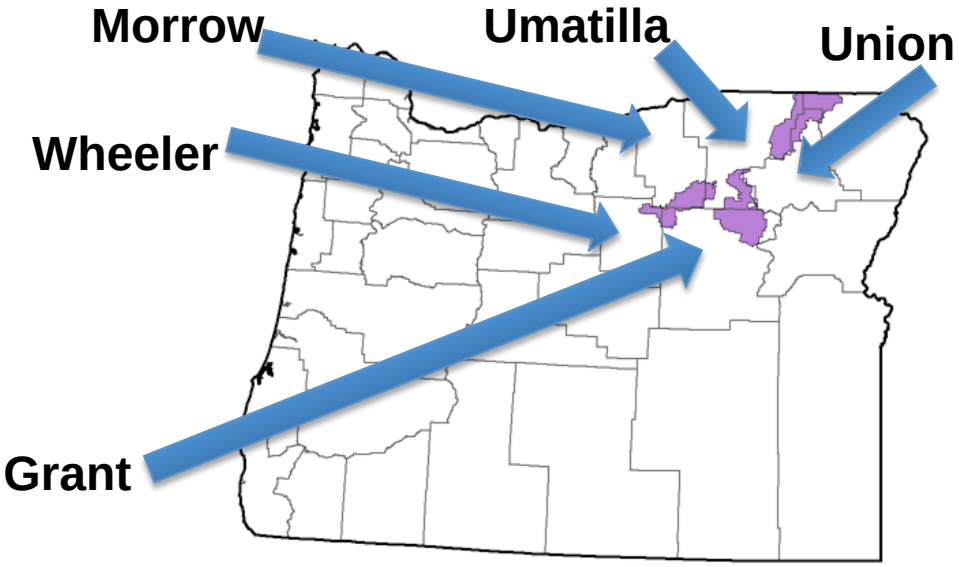
Prairie Junegrass: Collection

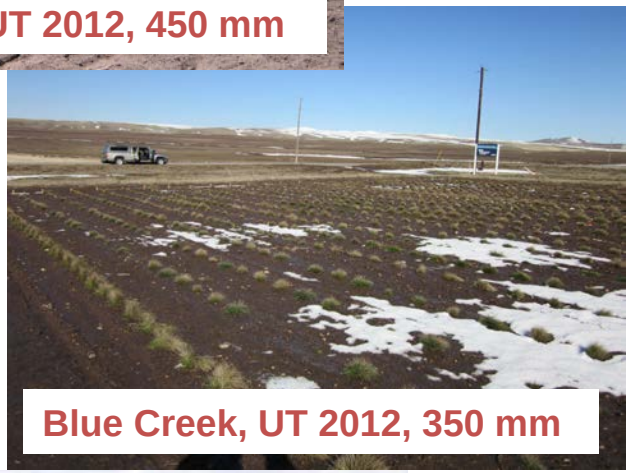


Prairie Junegrass: Evaluation

Experimental Design

- 3 Locations (450, 350, 200 mm)
- RCBD
- 3 replications
- Umatilla Prairie Junegrass
- 4 Cultivars (controls)
- 1 m rows with 0.5 m within rows
- 10 plants per plot
- 5 m length plots
- Evaluated for 2 years
- Traits evaluated
  1. Biomass (June)
  2. Regrowth (September/October)
  3. Persistence (Portion survived)
  4. Seed weight (Seeds/plant)


North Park, UT 2012, 450 mm


Blue Creek, UT 2012, 350 mm


Malta, ID 2012, 200 mm

Prairie Junegrass: ANOVA

Effect	df	Biomass	Regrowth	Persistence	Seed no.
Year	1	0.001	<0.001	0.044	<0.001
Location	2	<0.0001	0.014	0.018	0.004
Entry	4	0.019	<0.0001	0.167	0.508

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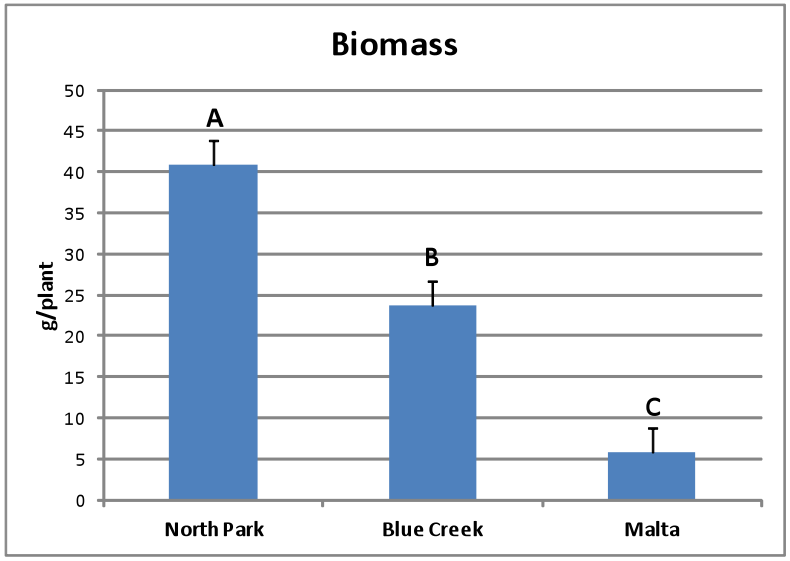
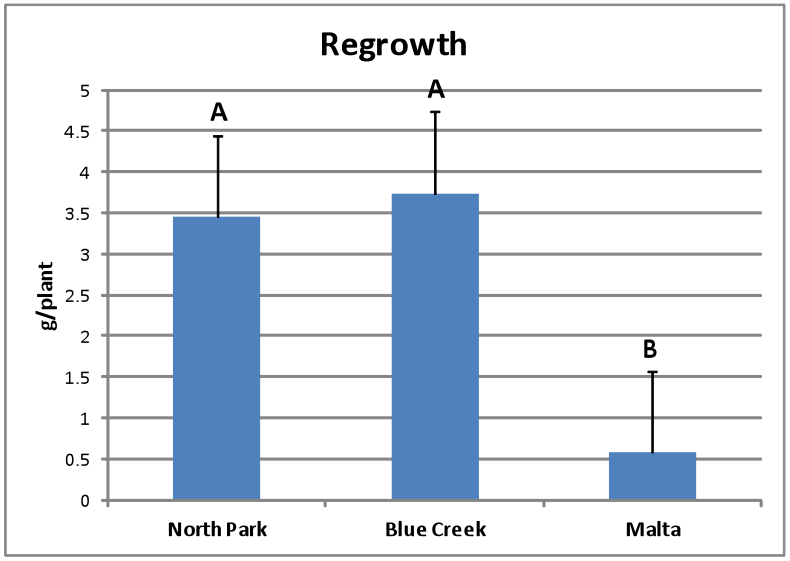
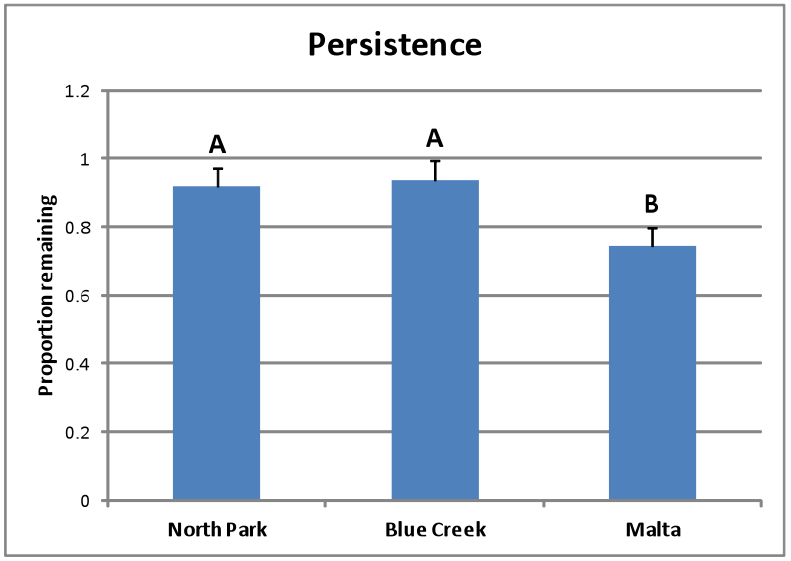
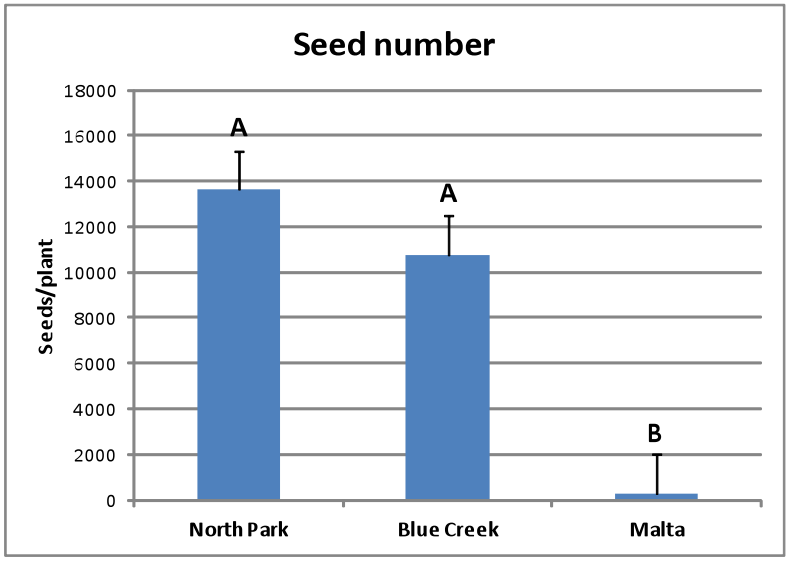
Prairie Junegrass: Location Effects









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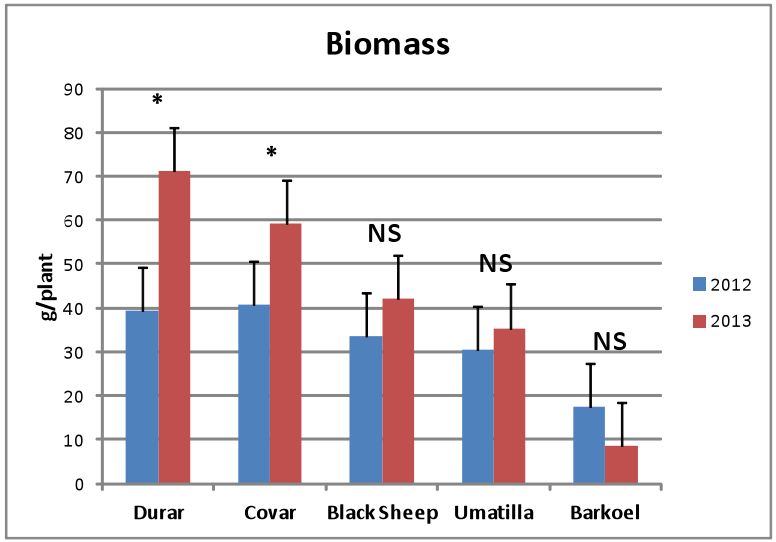
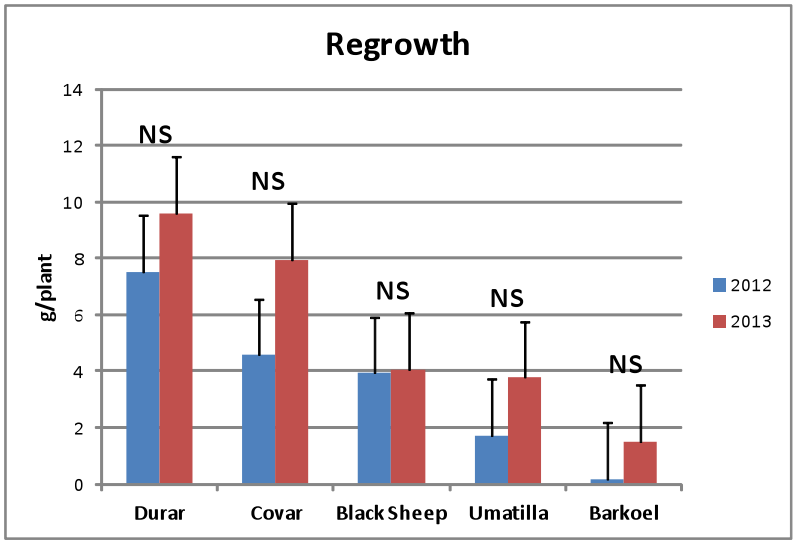
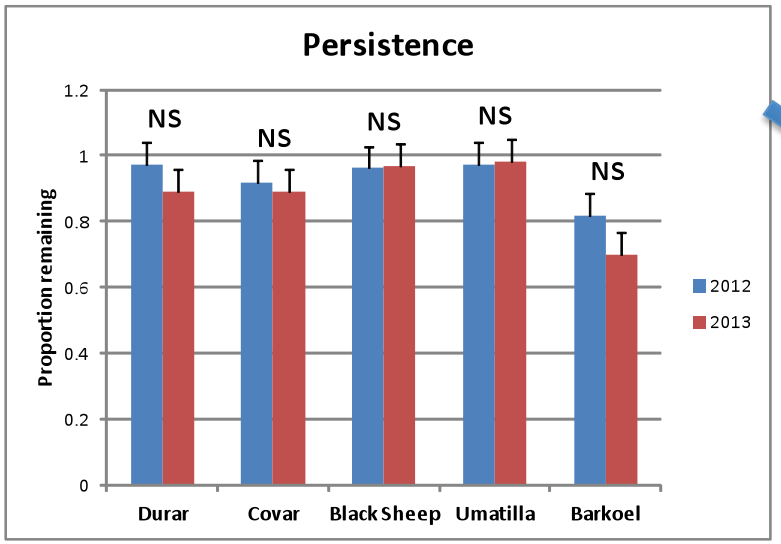
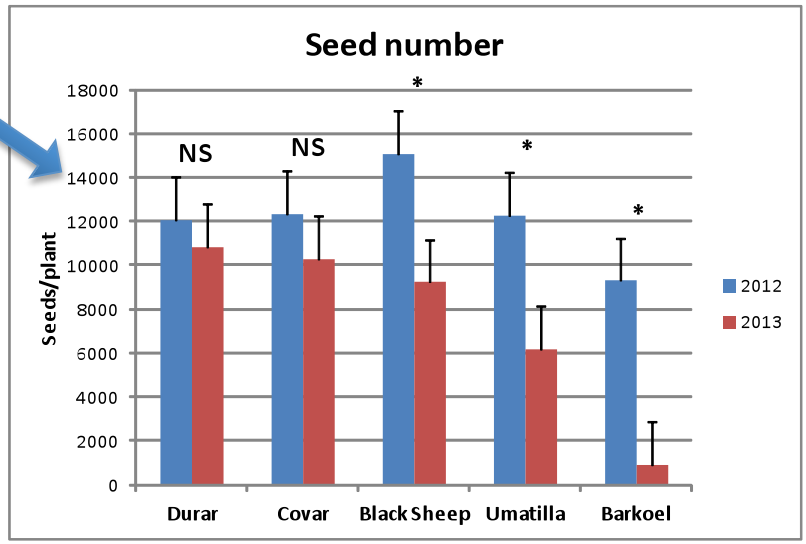
Prairie Junegrass: Similar Locations

North Park & Blue Creek









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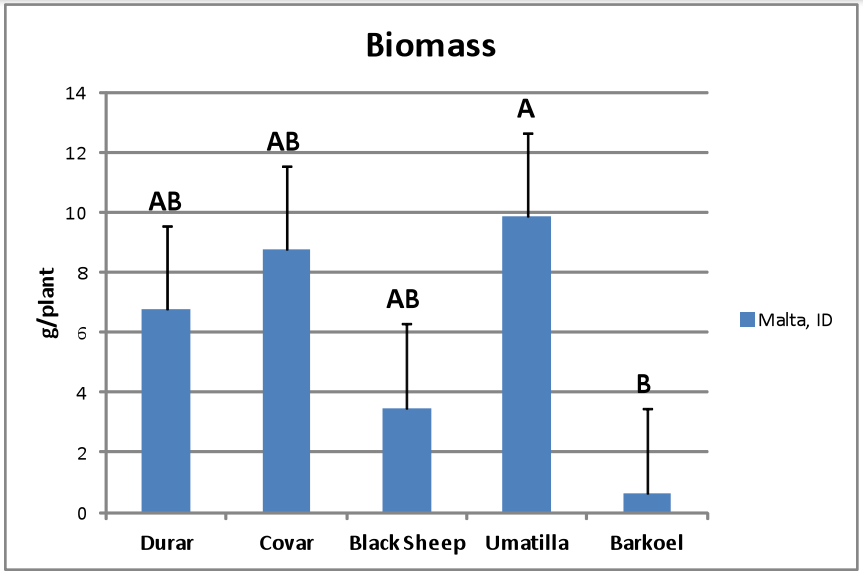
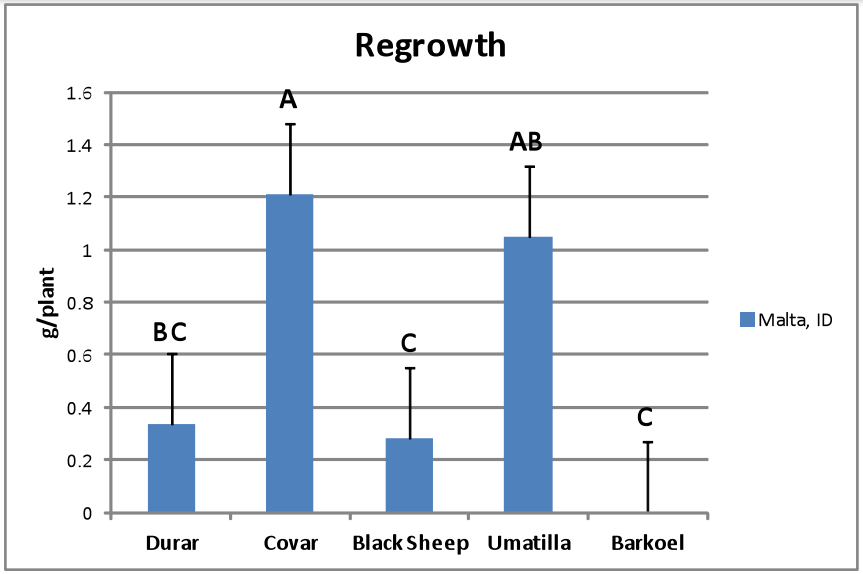
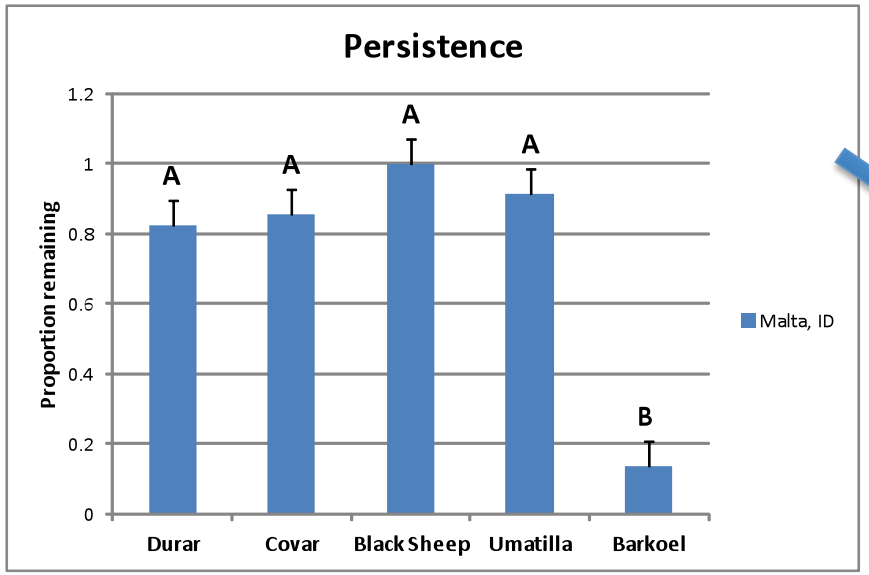
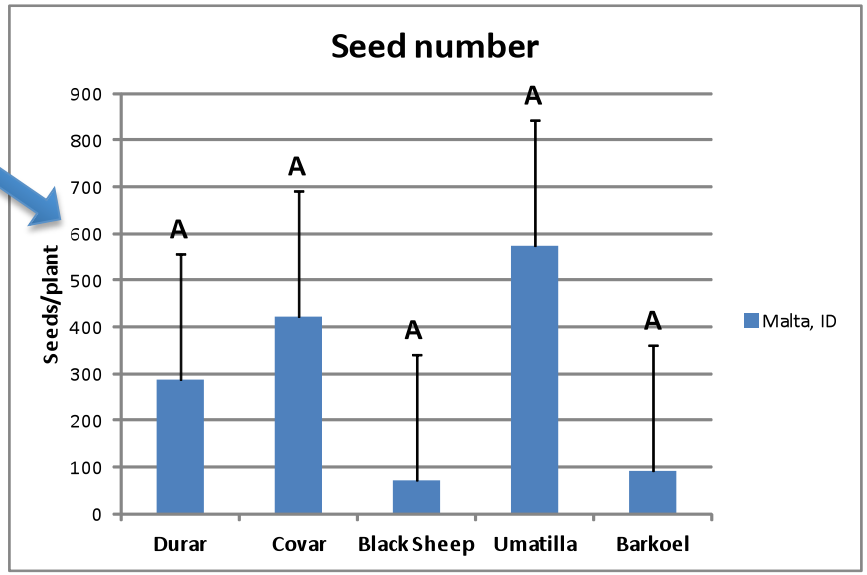
Prairie Junegrass: Malta ID









Prairie Junegrass: Commercialization

Umatilla

Target: 200 mm

9,000 seeds/plant

85% germination rate

Persistence

Regrowth

Umatilla

Barkoel

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Prairie Junegrass: Future Work

Fire Resilience

Mowing/Grazing

Seeding Establishment