Ecological and physiological functioning of native grass system

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Why is this research important?

- ❑ Grassland ecosystems are critical for sustaining biodiversity and crucial ecological processes including; soil erosion reduction, improved water quality, and carbon sequestration.
- ❑ This study will consider the role of native grasses in addressing landscape resilience in a changing climate.
- ❑ There is general lack of information about germination, field establishment, and growth of native grasses that must be investigated.

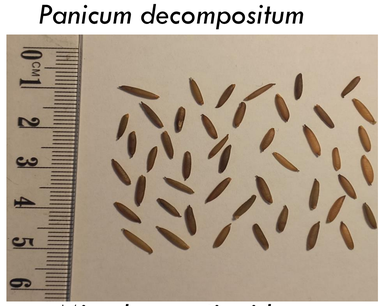
What are the benefits for growers?

- ❑ Identify optimal conditions for seed germination, establishment, and growth of selected native grasses.
- ❑ Adoption of native grasses in agricultural and natural settings or rehabilitation efforts will contribute to sustainable landscape and climate change mitigation.

Native grassland at Llara

Panicum decompositum

Panicum decompositum



Microlaena stipoides

Methodology

Lab Experiments
Germination trails testing of range of native grass species (e.g., temperature, light, dark, heat shock (60 ^{0}C for 2 min)).

Glasshouse experiments
Seedling establishment and growth under controlled conditions (e.g., heat stress (20, 25, and 30 ^{0}C), water deficit (40% and 80% field capacity), nutrient availability).

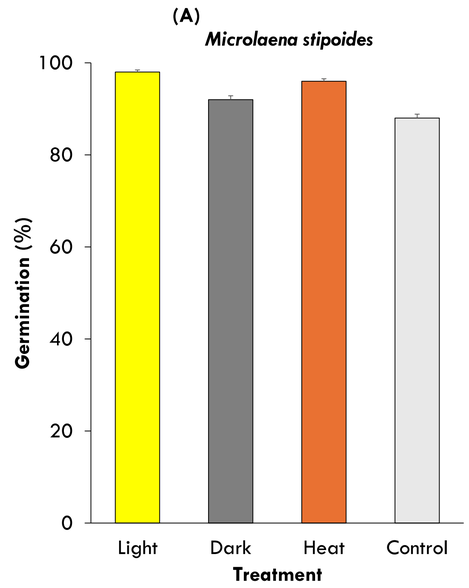
Field Experiment
Seedling establishment and growth under field conditions.
Investigation of mature plant (e.g., in response to nitrogen addition and soil type).

Results (for lab experiment)

Table 1.Variation in seed size and weight in different species of native grasses

Species	Length (cm)	Width (cm)	Weight of 10 seeds (g)
Microlaena stipoides	0.64±0.07	0.15±0.03	0.626±0.006
Neurachne alopecuroidea	0.28±0.04	0.14±0.02	0.177±0.005
Heteropogan contortus	0.81±0.05	0.10±0.03	0.018±0.005
Themeda triandra	0.77±0.07	0.13±0.03	0.410±0.004
Panicum decompositum	0.18±0.02	0.09±0.02	0.008±0.001

Seeds varied in size considerably with 10- fold differences in length and 100- fold differences in 10 seed weight (Table 1).
(A) *Microlaena stipoides* (Mic sti) and *Neurachne alopecuroidea* (Neu alo) showed a similar germination pattern.
❑ Highest germination in light, followed by heat
(B) *Heteropogon contortus* (Het con), *Panicum decompositum* (Pan dec), and *Themeda triandra* (The tri) also had a similar germination patterns.
❑ Highest germination in light followed by dark.
The range of germination percentage of each species differed (Table 2)



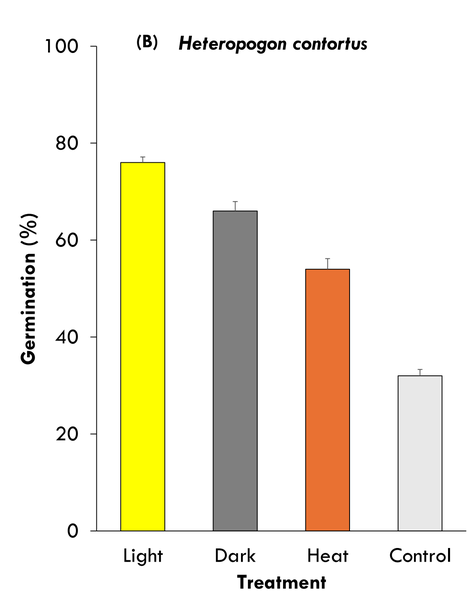


Table 2. Maximum and minimum germination

Species	Germination (%)
Mic sti	88-100
Neu alo	64-76
Het con	32-74
The tri	4-22
Pan dec	26-44

A

B

Germination of *Heteropogon contortus* (A) and *Microlaena stipoides*(B)