

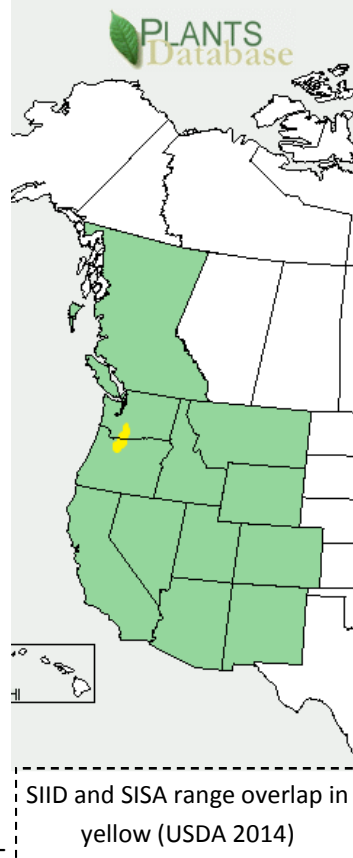
The *Sisyrinchium* Common Garden Study

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Background

Sisyrinchium sarmentosum Suks. (ex. Greene) is a member of the Iridaceae family and are known from # locations in south central Washington and north central Oregon. *S. sarmentosum*. A similar and more common species, *Sisyrinchium idahoense* E.P. Bicknell, occurs in a wider geographical area, encompassing the range of *S. sarmentosum*. Variability was observed in one population of *S. sarmentosum*, which led us to question whether hybridization was occurring.



Purpose

1. To determine what features, if any, distinguish *Sisyrinchium sarmentosum* from *Sisyrinchium idahoense*.
2. To remove the environment as a factor affecting phenotypic traits

Previous studies

Henderson first described *S. sarmentosum* and 13 other species of *Sisyrinchium* in the Pacific Northwest.

Raven (2006) looked at the variation of 5 populations of *S. sarmentosum* and *S. idahoense* and was able to suggest possible differences between two species but due to low replication in some data sets was not able to find anything conclusive.

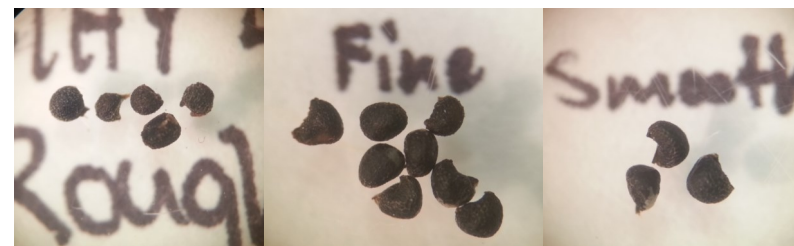
Isozyme work by Wilson et. al. (2001) found low genetic diversity within populations of *S. sarmentosum* but saw high variance between populations.

Previous work

During the summer of 2013, 513 plants from 10 locations were characterized by tepal color, tepal angle and tepal shape.

Methods

Seeds were collected in late summer 2013 and stored in the Miller Seed Vault in the Douglas Research Conservatory.



Seeds were characterized by coat coarseness and coat color under a dissecting microscope. Ten collections from each population with greater than 15 seeds were then bleached (11%) and placed into petri dishes with filter paper which were then placed into an incubator set for winter (5°C, 8hour photoperiod).

Seed dishes were watered twice a week and checked for germination once a week. Seed dishes with an excessive amount of fungal growth were re-bleached using the same bleach solution and placed back into the incubator.

Next steps

We are currently waiting for the seeds to germinate. Previous work by UWBG has indicated that seeds will germinate 12 weeks after sowing.

Once seeds germinate, they will be potted up and placed into the wet beds behind the Douglas Greenhouse. The plants will sit in < 2cm of water. Covers have been constructed to prevent tampering by wildlife.

Over 1,000 *S. sarmentosum*, *S. idahoense* and their hybrids will be grown to flowering when we can charac-

terize the flowers and harvest plants for morphology measurements.

Expected results

We will be able to compare traits of the seedlings between species and between or 10 sites.

Scenario 1: plants in the common garden will show similar traits to each other, regardless of lineage. In this case,

- There is no genetic basis for the variations that we see in the field.
- Variations in phenotype seen in the field and genetic similarities within populations may be attributable to differences between sites.
- Further studies to determine how the environment affects phenotype would be a possible next step.

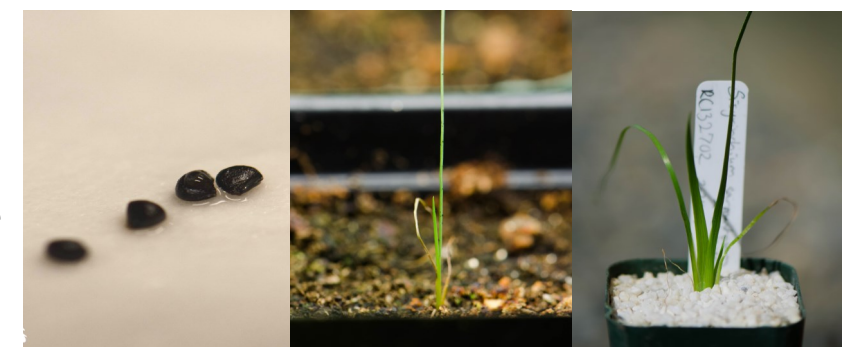
Scenario 2: plants in the common garden would retain their phenotypic differences seen in the field. In this case,

- There is a genetic basis for the differences in recorded traits
- Site conditions do not affect the phenotype of the plant.
- Other traits could be looked at to distinguish the two species, physiology for example.

References

- Raven A. (2006). An Exploration of Possible Hybridization between Pale Blue-Eyed Grass and Idaho Blue-Eyed Grass in Washington and Oregon. The Berry Botanic Garden. Portland OR.
- Wilson, BL, DL Doede and VD Hipkins. 2000. Isozyme variation in *Sisyrinchium sarmentosum* (Iridaceae). Northwest Science 74(4): 346-354.
- Henderson, D.H. 1972. A Biosystematic Study of the Genus *Sisyrinchium* (Iridaceae) in the Pacific Northwest. PhD Thesis, University of Washington. 184 pp.

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Got questions? Contact Christopher Wong at ck9@hawaii.edu