GERMINATION OF *LESQUERELLA LUDOVICIANA* AS AFFECTED BY COLONY LOCATION AND SEED MATURITY.

Shannon E. Beach[1], Janice M. Coons[1], Henry R. Owen[2], Brent L. Todd[2], and Mary Ann L. Smith[1]
[1]Department of Natural Resources and Environmental Sciences, University of Illinois, Urbana, IL, 61801 and
[2]Department of Biological Sciences Eastern Illinois University, Charleston, IL 61920.

A *Lesquerella ludoviciana* plant in flower.

ABSTRACT

Lesquerella ludoviciana (Nutt.) S. Wats. (silvery bladderpod) is a native, endangered, sand prairie plant in Illinois. The only known location where the plant currently exists in Illinois is in the Henry Allen Gleason Nature Preserve in Mason County. Within the nature preserve there are three separate colonies of *Lesquerella ludoviciana*. Seed was collected from these three colonies on June 1 and 16, 2000. On June 1, seed was divided into early (lower portion of the flower stalk) and late (upper portion of the flower stalk) flowering groups. On June 16, only the late flowering group had not dehisced. Thus three seed lots of differing maturity (June 1 – early, June 1 – late, June 16) were tested from each colony. Seeds were germinated on moistened filter paper in plastic petri dishes at 25ºC in continuous light. Germinated seeds were counted every two to three days. Overall, the average final germination percentage ranged from 20% to 66% for the seeds germinated. No clear colony differences in germination were observed as for each seed lot, a different colony was best (i.e. North Bowl, upper colony had the best germination for the June 1, early lot; the South Bowl had the best germination for the June 1 – late lot; and the North Bowl, lower colony had the best germination for the June 16 lot). In addition, no clear seed lot differences were observed in germination. For the upper colony of the North Bowl the early seed from the June 1 collection had the best germination rate. For the lower colony of the North Bowl the June 16 seed had the best germination rate, and for the South Bowl colony the late seed from the June 1 collection had the highest rate of germination. Thus, no clear differences were found due to colony or to seed maturity for 2000 seed.

INTRODUCTION

Lesquerella ludoviciana (silvery bladderpod) is a native plant that is endangered in Illinois. Other than descriptive information, habitat location, and reports of its existence, little is known about *Lesquerella ludoviciana* at the eastern edge of its range (Herkert, 1991). More knowledge of the plant's reproductive strategy is needed to make sound management decisions to maintain the plant in Illinois. At present, the only place that it naturally occurs in the state is in a sand prairie on the Henry Allen Gleason Nature Preserve in Mason County.

Three colonies of *Lesquerella ludoviciana* exist in the Nature Preserve with visible differences between them (Ebinger and McClain, 1999). One area (North Bowl, lower colony) is sparsely populated by plants with silvery bladderpod being the predominant species. In 1999, it was a 2,050 m^2 area containing approximately 10,300 silvery bladderpod plants. The second area (South Bowl) had a few other species, was smaller (272 m^2), and contained approximately 900 silvery bladderpod plants. The third area (North Bowl, upper colony) had many other plant species. It was 660 m^2 with approximately 220 silvery bladderpod plants (Coons, et al., 2000). The relative amount of open sand also varied with open sand decreasing as the number of plant species increased.

In 1999, seeds were collected from only the North Bowl, lower colony. Vigor of harvested seed varied for seed collected in 1999 when differences were found between the seed collection dates and position on the flower stalk (Coons, et al., 2000). A large difference was found in germination between seeds developed later or earlier on the flower stalk for the first collection date (June 8, 1999), with those from the earlier portion having a higher percentage. This difference was likely due to seed maturity. Percent germination for seeds collected from the later portion of the flower stalk on the second collection date (June 22, 1999) was similar to that of seeds from the earlier portion on the first collection date. Again this response probably relates to seed maturity.

Due to the visible differences in the three colonies of silvery bladderpod and to germination differences relative to seed maturity for one of these colonies (North Bowl, lower colony), a more in depth study was conducted including seeds of different maturity from each of the three colonies.

OBJECTIVES

The overall goal is to understand the germination strategy of *Lesquerella ludoviciana* to improve management decisions for its maintenance in Illinois.

The objectives were to compare germination of *Lesquerella ludoviciana* seeds of the Henry Allen Gleason Nature Preserve:
)From three colonies
For different seed maturities

PROCEDURE

Seeds were collected from the Henry Allen Gleason Nature Preserve where three colonies or blowout areas (North Bowl, lower colony; North Bowl, upper colony; South Bowl) of the plant exist. Seeds were collected on June 1 and June 16, 2000. The seeds collected on June 1 were split into two groups, i.e. early (lower half of the flower stalk) and late (upper half of the flower stalk). The second collection date contained only seeds from the upper stalk since all seeds from the lower stalk had already dehisced. Seeds were stored at 4.5ºC and 40-50% relative humidity until germination was tested in October through November 2000.

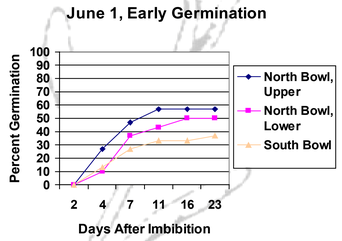
Two sheets of filter paper (Whatman #1) were placed in a plastic petri dish (10 x 1.5 cm) with 5 ml deionized water. The dishes then were sealed with parafilm. Thirty seeds from each group (i.e. colony and seed maturity) were used. All seeds were dusted with Thiram (50% active ingredient, tetramethylthiuram disulfide) prior to use for fungal control. Ten seeds from each group were placed in each dish, with three dishes (replications) per group. These dishes then were placed randomly in a plastic container (Rubbermaid, 41 x 28.5 x 17.5 cm) and placed in a controlled plant culture room at approximately 25ºC with 4.5 µmoles/m^2/sec of light. Germinated seeds were counted with a seed considered germinated if the radicle was evident.

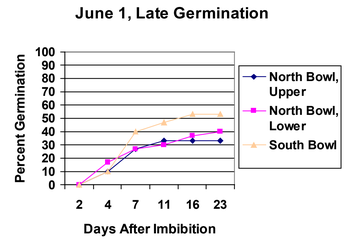
Data were analyzed using analysis of variance. The CoStat program was used for statistics, and to determine means and standard deviations of each seed group.

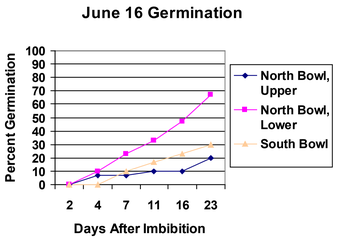
Table 1: Germination of Seed Collected in 2000 From Three Colonies

Colony	June 1, Early	June 1, Late	June 16
North Bowl, Upper	57% ± 15%	33% ± 32%	20% ± 10%
North Bowl, Lower	50% ± 26%	40% ± 26%	67% ± 21%
South Bowl	37% ± 12%	53% ± 25%	30% ± 20%

Table 1 indicates no significant difference in the germination percentage of the seed produced in the different colonies after 23 days.







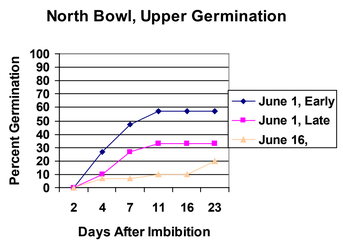
Germination rates were between all three colonies for the June 1 seed lots. However, for the June 16 seed lot the North Bowl, Lower Colony rates were higher than for the other two colonies.

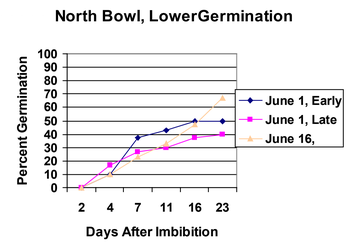
Table 2: Germination of *Lesquerella ludoviciana* Seeds Collected in 2000 at Different Maturities

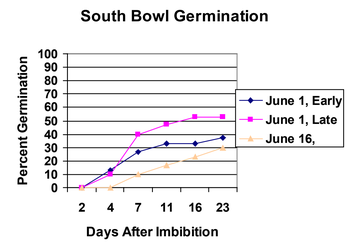
Seed Maturity	Colony: North Bowl, Upper	North Bowl, Lower	South Bowl
June 1, Early	57% ± 15%	50% ± 26%	37% ± 12%
June 1, Late	33% ± 32%	40% ± 26%	53% ± 25%
June 16	20% ± 10%	67% ± 21%	30% ± 20%

Table 2 indicates that none of the seed lots display a significantly different germination percentage than the other seed lots after 23 days.

North Bowl, Lower Colony







Germination rates varied for seeds from the North Bowl, Upper Colony and the South Bowl Colony, with June 16 seed being slower to germinate. However, rates for the North Bowl, Lower Colony were similar for all seed lots.

Summary

No clear differences were found due to seed maturity in the final germination percentages in 2000.

No clear differences were found due to colony in the final germination percentages in 2000.

Differences in rates of germinations were noticed between some colonies and some seed lots.

Literature Cited

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Acknowledgements

Environmental Council Special Undergraduate Research Experience Program

Jonathan Baldwin Turner Undergraduate Research Scholarship Program

Eastern Illinois University Council for Faculty Research

Illinois Department of Natural Resources

Background photo from Herkert (1991)