Comparison of Seed Production and Germination in Three Distinct Colonies of Lesquerella ludoviciana

Shannon E. Beach¹, Janice M. Coons¹, Henry R. Owen², Brent L. Todd², and Mary Ann L. Smith¹

¹Department of Natural Resources and Environmental Sciences, University of Illinois, Urbana, IL, 61801 and ²Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920.

ABSTRACT

Lesquerella ludoviciana (silyver bladdernpod) is an endangered, sand prairie plant in Illinois, where its only known habitat is the Henry Allen Gleason Nature Preserve. Three colonies are found within the preserve: North Bowl - upper, North Bowl - lower, and South Bowl. Objectives were to compare seed production and germination in these colonies. Stages of plant development (seedling, vegetative, and reproductive) were studied. Flower stalks, fruits, and seeds were collected from each colony on May 4, June 1, June 16, and July 16, 2000. Seed was collected from each colony on June 1 and June 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 seed of the late flowering group remained on plants. Thus, three seed lots of differing maturity were tested. Seeds were germinated at 25°C in continuous light, and counted every two to three days. Seed production was estimated using reproductive plant density, fruit numbers, and seeds per fruit. The three colonies varied greatly in seed production. The North Bowl – lower produced ten times more seed than the South Bowl, and sixty times more seed than the North Bowl – upper. Differences in seed production in each colony are due to many factors including: area (South Bowl ~ 270 m²; North Bowl, upper ~ 1824 m²; North Bowl, lower ~ 3248 m²), density of reproductive plants (South Bowl ~ 14 plants/m²; North Bowl, upper ~ 0.1 plants/m²; North Bowl, lower ~ 1 plants/m²), and presence of other plant species. Overall, germination percentages ranged from 20% to 66%. No colony differences in germination were observed. For each seed lot, a different colony exhibited better germination. Thus, no differences in germination were found due to colony but the seed production differed greatly between the colonies.

INTRODUCTION

Lesquerella ludoviciana (silyver bladdernpod) 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). At present, the only place that it naturally occurs Illinois is in a sand prairie on the Henry Allen Gleason Nature Preserve at Mason County. Three colonies of Lesquerella ludoviciana exist in the Nature Preserve with visible differences between them (Ebinger, 1998, Unpublished). One area (North Bowl, lower colony) is sparsely populated by plants with silver bladdernpod being the predominant species. In 1999, its area was 2,050 m² containing approximately 10,360 silver bladdernpod plants. The second area (South Bowl) had a few other species, was smaller (272 m²), and contained approximately 360 silver bladdernpod plants. The third area (North Bowl, upper colony) had many other plant species. It was 660 m² with approximately 220 silver bladdernpod 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. Viper of the harvest seeds 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. More knowledge of the plant’s reproductive strategy is needed to make sound management decisions to maintain the plant in Illinois. Due to the differences in plant populations between the three colonies, a study to compare the seed production and germination in these three colonies was undertaken.

PROCEDURE

Lesquerella ludoviciana is found in three colonies at the Henry Allen Gleason Nature Preserve in Illinois. In 2000, four trips were taken to the colonies. These trips occurred on May 4, June 1, June 16, and July 16, 2000. During all four trips, counts were taken for reproductive plant density, fruits per plant, and seeds per fruit. The three colonies were sampled using a transect of moles/m²/sec of light. Germinated seeds were counted with a seed counter. Seeds were germinated at 25°C in continuous light, and counted every two to three days. Seed production was estimated using reproductive plant density, fruit numbers, and seeds per fruit. The three colonies varied greatly in seed production. The North Bowl – lower produced ten times more seed than the South Bowl, and sixty times more seed than the North Bowl – upper. Differences in seed production in each colony are due to many factors including: area (South Bowl ~ 270 m²; North Bowl, upper ~ 1824 m²; North Bowl, lower ~ 3248 m²), density of reproductive plants (South Bowl ~ 14 plants/m²; North Bowl, upper ~ 0.1 plants/m²; North Bowl, lower ~ 1 plants/m²), and presence of other plant species. Overall, germination percentages ranged from 20% to 66%. No colony differences in germination were observed. For each seed lot, a different colony exhibited better germination. Thus, no differences in germination were found due to colony but the seed production differed greatly between the colonies.

LITERATURE CITED


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

SUMMARY

• North Bowl – Lower Colony produced approximately ten times more seed than the South Bowl and approximately sixty times more seed than the North Bowl – Upper Colony.
• Differences in seed production in each colony are due to factors such as number of reproductive plants and number of fruits per plant.
• No colony differences in germination were observed.

DATA COLLECTION

Shannon E. Beach

Shannon E. Beach

Shannon E. Beach

Shannon E. Beach