Plant Performance in Curb Cut Rain Gardens

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Introduction

In the summer and fall of 2015, Plaster Creek Stewards began installing "curb cut" rain gardens in the Alger Heights and Oakdale Neighborhoods of Grand Rapids, MI. These gardens receive stormwater runoff from the street through a cut in the curb, and they are planted with native Michigan plants to increase water absorption and promote biodiversity in an urban setting. This project assessed the performance and survivorship of the most common plants in the rain gardens in order to better plan and design them in the future.

Objectives

- Evaluate the survivorship of common rain garden plants
- Evaluate performance (overall and through specific variables) of common rain garden plants
- Generate useful data for planning and planting future gardens
- Create a list of all-star plants to focus on in seed collection, germination, propagation, and use in the gardens

Figure 1: The curb cut of a two year old rain garden on Linden Ave. in Alger Heights, MI

Methods

Preparation

Maps of the plantings were used to identify plants that were present in at least 4, one year old rain gardens. Plants of interest for the study include big-leaved aster, black-eyed susan, butterfly weed, *Carex rosea*, lanceleaf coreopsis, foxglove beardtongue, hairy beardtongue, nodding wild onion, Ohio horsemint, prairie alumroot, prairie dropseed, purple coneflower, roundleaf ragwort, wild columbine, wild lupine, and wild strawberry.

Data Collection

Rain gardens that were planted in the summer and fall of 2016 were visited as test sites. At all 11 sites, the plants of interest were counted and given an overall performance value from 1 to 10. For each species, 5 plants were selected randomly and measured for height and a performance variable (leaf number, stalk number, or clump width). Data from 2016 that was collected at the same time of year and using the same standards was combined with current data. This data was included to increase the number of plants that could be analyzed.

Survivorship

Counts were compared to the number of originally installed plants. A percent of survivorship was reported (this included over 100% survivorship to show plant spread).

Height

Height was recorded as a percent of a maximum height for the plant in order to standardize the heights of plants across species (Prairie Nursery).

Statistics

An ANOVA test was run on the overall performance rating to compare all the plants. For the percentage values of survivorship a Chi-square test was run to assess the differences between species.

Results

Performance:

There was no significant difference in overall performance between plants (P = 0.94).

Survivorship:

There was a significant difference in survivorship between species (P = 0.000). Roundleaf ragwort and wild strawberry had the greatest survivorship with 360% and 222% survivorship respectively. Wild lupine had the lowest survivorship at 57%.
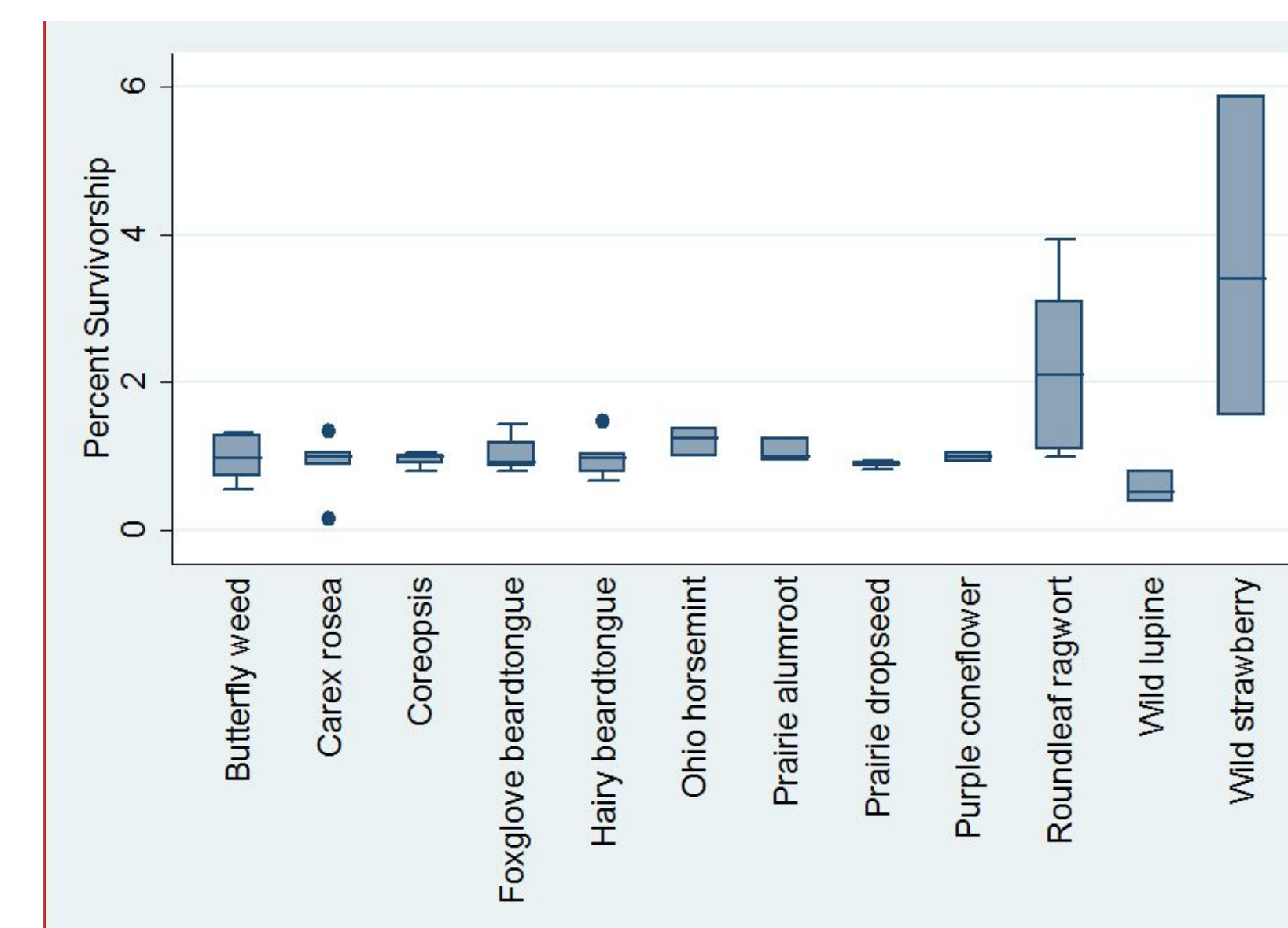

Figure 2: The percent survivorship after one year

Future Plans

- Need more complete initial plant counts for future data collection
- Measure height change by looking at the same 11 gardens next year
- Unless comparing gardens, only collect data on variables that can be compared statistically across species
- Second round of data collection at end of summer or beginning of fall 2017
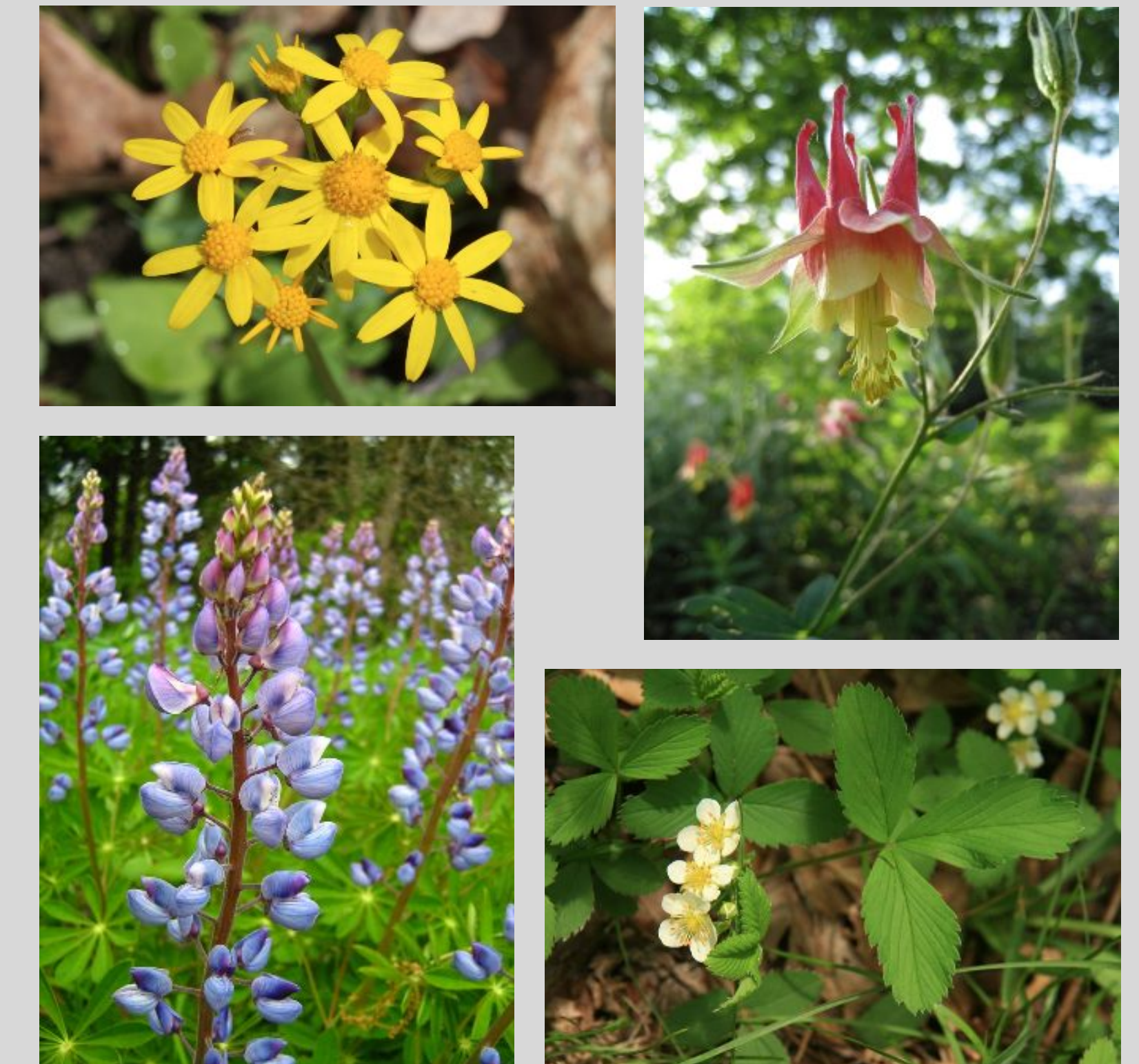- Create a survey for rain garden homeowners to identify their favorite native plants

Figure 3: Clockwise from top left - round leaf ragwort, wild columbine, wild strawberry, wild lupine (michiganflora.net)

Conclusions

- Though not statistically significant, wild columbine had the same trend of low survivorship as lupine
- There were some missing counts of species planted, so not all the plants measured could be assessed completely
- Species with low survivorship should be planted in greater volume to help with establishment, and species with the capacity to spread can be used for quick cover but should be used carefully
- Individual performance variables do not help with statistical comparison, though they do allow us to see which garden conditions do better than others

Acknowledgments