Aug 2nd, 11:30 AM - 1:30 PM

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**Recommended Citation**
Sinnott, Kate; Simpson, Emma; Madsen, Kathleen; and Jackson, Laura, "Effects of seed mix and surrounding land cover on Asclepias syriaca density in the Conservation Reserve Program's Pollinator Habitat plantings" (2019). *Summer Undergraduate Research Program (SURP)*. 6.
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Effects of seed mix and surrounding land cover on *Asclepias syriaca* density in the Conservation Reserve Program's Pollinator Habitat plantings

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**BACKGROUND**

We examine the density of Common Milkweed (*Asclepias syriaca*) in relation to the seed mix and surrounding land cover in Conservation Reserve Program (CRP) Pollinator Habitat Initiative (CP-42) plantings. Long thought of as an agricultural "weed," *A. syriaca* readily establishes itself in roadways and disturbed landscapes. However, specifications for establishing *A. syriaca* in restorations are not well known.

We want to know if seeding *A. syriaca* is necessary for its establishment, or if milkweed populations in the surrounding landscape could spread into the plantings. By understanding the density of *A. syriaca* in CP-42 plantings, we can adapt policy and management to efficiently provide crucial breeding habitat for monarchs.

**METHODS**

**Plant Density Sampling:**

- 45 CP-42 sites were surveyed during the months of June and July in 2018 and 2019. All sites were in their third year of establishment and within a 60-mile radius of Cedar Falls, Iowa.
- We used ArcGIS to randomly establish nine 100m transects at each CP-42 site (Figure 3).
  - At five of these transects, a 1m² quadrat was observed every 7m for presence of all plant species within the quadrat (Figure 1).
  - At the remaining four transects, a 1m² (2018) or 2m² (2019) quadrat was observed every 7m for density of *Asclepias* spp. (Figure 4).
- Between these nine transects, total of 150m² (2018) and 225m² (2019) were surveyed at each site for milkweed stem and plant number.

**Land Cover Categorization:**

- In ArcGIS, polygons of the CP-42 plantings were buffered to 1km then clipped so the planting itself was not included in the analysis.
- We used the "Extract by Mask" tool on the High Resolution Land Cover of Iowa in 2009 (Iowa DNR 2017) raster layer to extract cells of the raster that correspond to the mask of the 1km buffer (Figure 5).

**Data Analysis:**

- Density (stems / m²) was calculated for each site.
- Percentages of land cover were calculated from the data extracted within the 1km buffer.
- We performed linear regressions in SigmaPlot comparing density at each site with different site factors.
- Each point in Figures 7-10 represents an individual CP-42 site.

**RESULTS**

- *A. syriaca* density is significantly higher in CP-42 fields where it has been seeded with higher seeding rates (Figure 7).
- There is no significant correlation between density and percentage of the surrounding area covered by road, forest, or habitat suitable for *A. syriaca* (Figures 8-10).
- Based on these results, we determine that seed mix is important for establishing higher densities of *A. syriaca* in CP-42 plantings.
- At this time, we cannot draw conclusions on the importance of surrounding land cover on *A. syriaca* density. More factors need to be tested.

**FUTURE DIRECTION**

- More sites in which *A. syriaca* has not been sown need to be surveyed in order to gain a clearer understanding of the factors that influence its establishment.
- Impact of land cover should be analyzed using a smaller buffer (100m).
- Further analysis is needed to examine factors that may influence density. Our next step is to look at soil drainage classes.
- Impact of surrounding land cover should be analyzed in sites at different points in time (e.g. 1st year sites, 10th year sites).

**ACKNOWLEDGEMENTS**

Field crew: Alyssa Burgert, Allison Eagan, Pryce Johnson, Kate Madsen, Corinne Myers, Emma Simpson, and Ervina Tabakovic.

Advisors: Dr. Kenneth Elgeroma, Dr. Laura Jackson, Dr. Mark Myers, Dr. Mark Sherrard, and Dr. Ai Wen.

Special thanks to Dr. Justin Meissan and Laura Fischer Walter for assisting with plant identification.

Thank you to the CP-42 landowners - without your willingness to participate, this study would not be possible.

This research was made possible by the Roy J. Carver Charitable Trust, the U.S. Department of Agriculture Farm Service Agency, and UNI’s Biology Summer Undergraduate Research Program.

**WORKS CITED**


