Assessing Wild Lupine's Reproductive Success through its Distribution

Maggie Blondeau, June 2022

Wild Lupine, or *Lupinus perennis*, is a perennial flowering legume that can be found in Eastern North America, all the way to the American Mid-West. A handful of locations in Southern Ontario are where the northern-most populations occur, though they are few and far between due to the loss of dune and oak savannah habitat. The Wild Lupine is still awaiting assessment by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to determine its risk status, and little is known about this species ability to reproduce successfully in northern, Canadian populations. I am surveying populations near the core of its distribution in the Indiana Dunes State Park and the Ohio Metroparks in the USA, as well as Turkey Point in Ontario, and populations near the edge of its distribution in Pinery Provincial Park, Rice Lake Plains, and High Park, all in Ontario (see map below). My project aims to determine how successful these northern populations are at reproducing compared to those near the core of its distribution.

To determine the reproductive success of Wild Lupine, I will be comparing flower and seed production between populations, as well as the population and pollination dynamics that may influence it. The amount of seed produced by the population directly influences population's ability to survive and grow through time, and population size, density, and flower production can impact the pollination that allows for seed production. For example, larger floral displays that result from larger, more dense groupings of flowers are more attractive to bees than smaller ones. In order to get these estimates, I am surveying populations for flower abundance, plant density, as well as identifying which pollinators pollinate this plant species, and how often and effective they are at doing so. Ultimately, I aim to determine if populations in the core of the distribution produce a different number of seed from those at the edge of its distribution, and if that difference can be associated to differences in population size, density, or pollinator activity.

In addition to surveying populations and estimating seed production, I am conducting an experimental set up involving pollinator exclusion. I am supplementing flowers on individual plants with extra pollen from non-self individuals. I then tie little mesh bags to these individual flowers to exclude pollinators, but also because the seed pods of *Lupinus perennis* burst at maturity, and I need to capture their seeds to count them! Comparing how many seeds these flowers produce to open flowers that have been insect pollinated allows me to tell if pollinators are doing as an effective job at pollinating as possible. If my hand pollinated flowers produce more seed than those that are insect pollinated, then we know that the insects are not optimally pollinating the flowers. We can then compare these results across populations, and relate them back to pollinator activity, and population size and density.

The results of my project are yet to come, but I hope they shed light on the reproductive health of our northern populations, and inform others who are interested in Wild Lupines on how well our Canadian populations are doing. This beautiful species occurs only in a handful of location in Canada, so if you see it, make sure to stop and admire it, or even take a picture and upload it to a citizen science app (like iNaturalist) that records where you found it so that other scientists like me can have a more holistic understanding of its distribution here in Canada! After all, conservation of our native species takes a village.

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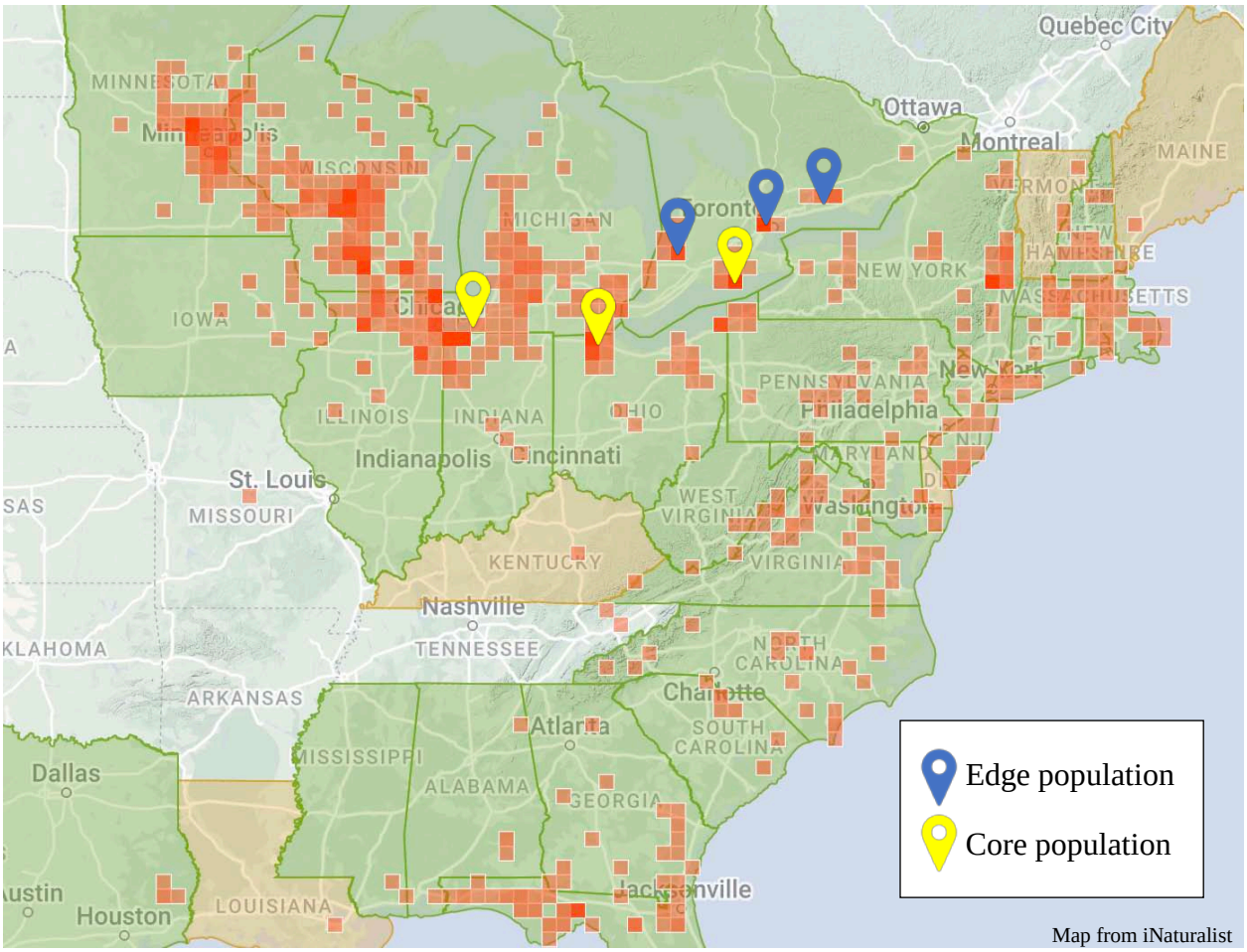

Map from iNaturalist