New England Botanical Society
Graduate Student Research Award
2021 AWARD WINNER

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Have human-mediated disturbances led to changes in pollination of native flowering plants?

Climate change and urbanization are two major human-mediated disturbances currently impacting the globe. These disturbances have important consequences not only for species abundance but also for species interactions. For example, both of these disturbances may have reduced or altered pollination and thus have negatively affected plant reproduction over the last century. Increasing annual temperature as a result of climate change has caused many species of plants to flower earlier in the year than when their primary pollinators are active. Urbanization has fragmented and reduced natural habitat that important pollinating insects rely on, causing major declines in many pollinators' abundance. While it is known that flowering time has shifted earlier in the year, and that the identity and number of pollinating insects has changed, evidence of the effect of these changes over the last century on pollination has yet to be collected. My research aims to fill this gap, using specimens of plant species that botanists have collected and preserved in herbaria over the last century. These herbarium specimens act as snapshots of a plant's life at a particular point in time, including pollen deposited on flowers by pollinators. For six native flowering species, I will choose herbarium specimens collected from paired natural and urban areas across the Mid-Atlantic United States. From flowers on these specimens, I will collect, identify, and quantify pollen to determine how it has changed over the last century. Additionally, I will use records of pollinator identity and abundance, climate change, and urbanization to correlate changes in pollen deposition with these disturbances. I predict that the identity and quantity of pollen deposited on flowers has changed more in plants collected from urban areas than plants collected from natural areas, indicating that climate change and urbanization combined have a more negative impact on pollination than climate change alone.

The New England Botanical Society offers awards of up to $3,000 to graduate students to support botanical research. The awards encourage and support botanical research on the New England flora (plants, algae, and fungi), including support for field, lab, and herbarium work, as well as travel to New England by those who would not otherwise be able to work in the region. The awards are made to the graduate student(s) submitting the best research proposal dealing with systematic botany, plant ecology, genetics, plant conservation biology, or related fields pertaining to the New England flora.