New England Botanical Society
Graduate Student Research Award
2024 AWARD WINNER

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Mountain plants on the move: Tracking 60 years of climate-induced changes on Whiteface Mountain, New York State

Ecological communities worldwide are already changing in response to warming climate, and temperatures are predicted to continue rising. These changes are often most pronounced in the areas where cold temperatures are most limiting to survival—the poles and high elevation. With temperature limitations lessened, species that previously could not survive these limits are able to spread into new territory, such as upslope in elevation along a mountain. The elevational gradient on mountains can be particularly useful for studying ecological changes: as elevation increases, temperature decreases, thus plant species tend to spread upslope as temperature limitations lessen. In the northeast, this gradient of elevation and temperature tends to structure plant communities into two distinct groups. At lower elevations, northern hardwood forest predominates, whereas at high elevation, boreal conifer forest is most prominent. The limiting effects of climatic constraints on the upslope expansion of plants are most evident between these two communities, an area known as the ecotone. Where differing plant communities collide, the effects of changing temperatures are often observed most clearly.

Past studies have observed changes in both individual species distributions and plant community composition. Although upslope shifts are most expected and often observed, downslope shifts occur as well. There are multiple possible explanations for these mixed results—climate change is not the only driver of plant species distributional shifts. For example, disturbances from logging or fire may also contribute. To address these complexities, I will resurvey forest vegetation at 34 historic plots on Whiteface Mountain in New York State. These plots were originally surveyed in the 1960s and resurveyed in 1982. Whiteface Mountain has a well-documented disturbance history, allowing me to assess shifts in plant species and plant community composition over time in relation to past disturbance as well as climate. This historic dataset remains largely unutilized and provides a rare opportunity to examine vegetation changes over a 60-year period. This research could yield unique insights into how the interactions of climate change and disturbance shape plant responses—an ever-pressing question in our changing world.

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 and within 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.