The New England Botanical Club
Graduate Student Research Awards
2019 AWARD WINNER

Jamie Harrison
Biology Department
Boston University
Boston, MA

Combined effects of growing season warming and winter freeze/thaw cycles on northern hardwood forest ecosystems of New England

Climate models project higher growing season air temperatures and decreased depth and duration of winter snowpack for the northeastern United States over the next century. Together, these climatic changes will warm soils in the growing season and induce greater frequency of soil freeze/thaw cycles in winter. Past research indicates that soil warming increases nitrogen mineralization rates and nitrogen and carbon uptake by plants, while soil freeze/thaw cycles increase root injury and mortality, leading to reduced plant nitrogen and carbon uptake. These changes in climate may alter foliar chemistry, plant photosynthetic capacity, and forest carbon storage as well. However, it remains unknown how the combined effects of warmer growing season soil temperatures and winter soil freeze/thaw cycles affect nitrogen cycling and foliar nitrogen in northern hardwood forests. I will examine the effects of projected changes in soil temperatures on (1) soil nitrogen availability to trees since this is the element often limiting rates of growth by temperate forest trees, (2) the amount of nitrogen taken up by trees, and (3) the net amount of carbon assimilated and stored by northern forest ecosystems. All of this information will allow for better predictions of carbon storage and health of New England forests.

The New England Botanical Club offers each year up to $6,000 total in support of botanical research to be conducted by graduate students. The awards are made to stimulate and encourage botanical research on the New England flora, and to make possible visits to the New England region by those who would not otherwise be able to do so. It is anticipated that two to three awards will be given, although the actual number and amount of awards will depend on the proposals received. The awards are given to the graduate student(s) submitting the best research proposal dealing with systematic botany, biosystematics, plant ecology, or plant conservation biology.