

Sarah Kowaleski, Fordham University. Genetic Diversity of Photobionts in Lichen Species found on an Urban to Suburban Gradient. Mentor: Jason Munshi-South.

Abstract: In recent decades, there has been a rapid increase in urban developments. Global urbanization, which is the development of cities, has significantly altered the environment in dramatic ways. However, some species are able to adapt to these environmental changes, ultimately allowing them to thrive in urban landscapes. Lichen are suspected to be one of these species that have evolved as a result of urbanization. During the era of industrialization, lichen had been extensively eradicated from urbanized areas as a result of air pollution and increased temperatures. Despite these urban pressures, lichen have recently recolonized cities. On that account, I hypothesized that urban and suburban species of photobionts in lichen differ in their genotypes. To test this, I collected 251 samples of lichen species, which included *Flavoparmelia caperata*, *Candelaria concolor*, and *Phycia stellaris*, on an urban to suburban gradient in the New York metropolitan area. I used DNA extraction, PCR, gel electrophoresis, Sanger sequencing, and chromatogram analyses in order to identify haplotypes between members of each species of lichen. From these results, it seems like many of these urban and suburban sites share photobiont haplotypes, therefore there is no conclusive trend on urbanization. Further, there is a relatively low genetic diversity for photobionts in lichen on an urban to suburban gradient. It was also noted that *Trebouxia* species of photobionts, including *gelatinosa*, *impressa*, *incrustata*, *corticola*, and *anticipata*, were found to exist in lichen symbioses at the study sites on an urban to suburban gradient.