Negligible Senescence in a Graveyard: The Demography of *Xanthoparmelia* Lichens

Since 2005, I have been collecting demographic data from a population of *Xanthoparmelia* lichens growing in a New England Cemetery. In this talk, I'll start by describing a mathematical model developed to understand growth rates. Lichens fix carbon dioxide from the air to build biomass. Smaller *Xanthoparmelia* grow slowly, but with small, steady increases in radial growth rate over time. Larger individuals grow more quickly and with a roughly constant radial velocity maintained over the lifetime of the lichen. This growth pattern follows directly from the diffusion of carbon dioxide in the air around a lichen. When a lichen is small, carbon dioxide is fixed across its surface, and the entire thallus contributes to radial growth, but when a lichen is larger carbon dioxide is disproportionately fixed at the edges of an individual, which are the primary drivers of growth. Tests of the model against data suggest it provides an accurate, robust, and universal framework for understanding the growth dynamics of both large and small lichens in nature. I will go on to describe tests for senescence among the *Xanthoparmelia*, and suggest there is evidence for negligible senescence in this population. As highlighted by the theoretical model, growth rates do not slow as lichens age. Lichens appear to reproduce more, and not less, as individuals grow older, and mortality is shaped by size, not age.