Diversity of Free-living Soil Nematodes in an Urban-Metropolitan Region

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Parasitic nematodes infect over one billion individuals globally and cause over $120 billion of crop damage annually. The first objective in this project is to investigate the diversity of soil nematodes in the five New York City boroughs, some of which are islands and geographically isolated. The second objective is to investigate the feeding behaviors, classified as solitary or social, of the nematodes isolated from the different regions. All isolates from Brooklyn, Bronx, Queens, and Staten Island aggregated in clumps, which indicates social feeding behavior. Manhattan isolates dispersed uniformly across the bacterial lawn, thereby exhibiting solitary feeding behavior. The isolates were also classified on their pharyngeal morphologies and grouped into one of five families to determine the relationship between pharyngeal morphology and feeding behavior. The observed pharyngeal morphologies and feeding behaviors did not match a DNA barcode analysis of the 18s rDNA, which proved to be a stronger species determinant than morphological classification. Overall, there was a strong diversity of nematodes throughout the five boroughs of New York City. Although the Manhattan isolates showed solitary feeding behavior, their barcode indicated that they are Oscheius sp. FVV-2, which were found in other boroughs as well. The reason underlying the different feeding behavior of the Manhattan isolate compared to the Brooklyn and Staten Island isolates is unclear, but may be due to a polymorphism in the npr-1 gene, of which mutations have been linked to different feeding behaviors in C. elegans. Future examination of the npr-1 gene may reveal these differences.

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