CONSIDER FOR TALK

2023 SEA Symposium Abstract

New Mexico Institute of Mining and Technology

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A Microbiological Analysis of Desert Soil Bacteriophages: Lysis to Kill

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Despite being incredibly abundant on Earth, bacteriophages (viruses that infect bacteria) are relatively unknown to science. Our research aims to address this by discovering, archiving, and analyzing novel desert phages that infect soil microbes, with implications for how phages contribute to global ecosystem dynamics. As part of the SEA-PHAGES – Phage Discovery course at NMT, we isolated eight previously unknown bacteriophages from local soil samples by either direct selection or enrichment culture, in which the soil samples were seeded with the host bacterium (Gordonia rubripertincta) to facilitate phage recovery. Transmission electron microscopy was performed to carry out morphological phage classification. Our phages fell into two families based on morphology, six Siphoviridae and two Myoviridae, each with varying tail lengths, tail widths, tail flexibility, and capsid sizes. All eight phages exhibited a lytic lifestyle. We also used restriction enzyme analysis of extracted DNA to demonstrate that each phage was genetically distinct. Together, these eight phages expand our understanding of desert phage biodiversity, and add to the repertoire of available phages for use in biotechnological applications through the SEA-PHAGES program, part of the HHMI Science Education Alliance. This program has given freshmen at NMT hands-on, course-based research experience as an introduction to the Biology and Biomedical Sciences programs.