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2024 SEA Symposium Abstract

University of Maine, Honors College

Orono ME

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Characterization of the mycobacteriophage Teaspoon, a unique cluster E phage.

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Mycobacterium abscessus, an extensively drug-resistant strain of non-tuberculosis mycobacteria (NTM), poses a significant health threat by causing a variety of respiratory and skin infections particularly in immunocompromised populations. Alarmingly, 1 out of 5 cystic fibrosis patients are at a risk of getting an NTM infection. Mycobacteriophage are viruses that infect mycobacteria and have been successfully used to treat drug-resistant mycobacterial infections. Isolating novel mycobacteriophages increases our understanding of phage diversity and opportunities to improve phage therapy. The cluster E mycobacteriophage, Teaspoon, was isolated from soil collected in Orono, ME using Mycobacterium smegmatis as the host bacterium. Teaspoon forms small turbid plaques and does not appear to have a broad host range on other mycobacteria tested. Teaspoon has a circular permuted genome that is 70,942 bp in length, a GC content of 63.2%, encodes 122 putative genes and 2 tRNAs. The Teaspoon genome is the shortest of the cluster E phages due to a ~4,500-bp deletion on the right arm. Teaspoon encodes two orphams, a couple WhiB transcription factors and several membrane proteins. Genomic comparison of Teaspoon with other cluster E phages will help understand these unique features.