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2025 SEA Symposium Abstract

University of Maine, Honors College

Orono ME

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Tiny but Mighty: Characterization of Novel JB Curtobacteriophages Razzleberry and Zooweemomama

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Curtobacterium flaccumfaciens is a pathogen of dry beans which significantly reduces global legume yields. Curtobacterium phages, viruses that infect Curtobacteria, offer a potential biocontrol method, however, few Curtobacterium phages have been isolated and characterized. Two novel curtobacteriophages were isolated from soil in Orono, ME, on the host C. flaccumfaciens NRRL B-59340 through an enrichment isolation procedure. Razzleberry and Zoowemomama have Podoviridae morphologies, and Razzleberry is able form lysogens with the efficiency of 16.79%. Zooweemomama lysogens demonstrated superinfection immunity and released particles into culture supernatents. Razzleberry has been assigned to Cluster JB. Razzleberry has a genome length of 18,500 bp, a GC content of 53.7,% and encodes 22 protein-coding genes. Zooweemomama has a genome length of 18,122 bp and a GC content of 54.6%. and encodes 22 protein-coding genes. No tRNA’s were present in either genome. The genome organization of Zooweemomama and Razzleberry are consistent with other podovirus genomes and begin with genes involved in DNA replication (gp1-4). The subsequent structural genes (gp5-16) include the major capsid protein, the knob protein, lysis genes, and a minor tail protein. The right end of the genome encodes 5-6 short genes of unknown function. It is not yet understood how the phages establish and maintain lysogeny. Some temperate podoviruses use the bacterial LexA repressor to inhibit lytic gene expression; due to this, we will analyze the genome for LexA binding sites. We will also determine the effect of UV light on the phage life cycle.