CONSIDER FOR TALK

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Genetic Diversity and Surprising Host Range of Fourty-Two Microbacteriophages Isolated at Western Carolina University

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Western Carolina University (WCU) has been a part of the SEA-PHAGES program for the past four years. During this time WCU students have isolated and archived 84 Actinobacteriophages. The bacterial host *Microbacterium foliorum* has been used for virus isolation for the past two years. In 2017, twenty Microbacteriophages were isolated and archived but initial discovery was slow with many students performing multiple rounds of spot tests. However, in 2018 due to an increase in calcium during enrichment over half the class isolated a Microbacteriophage after only one attempt. A total of twenty-two Microbacteriophages were isolated and archived by WCU students in 2018. The Microbacteriophages discovered in 2018 had very different characteristics than those discovered in the previous year. Three of these bacteriophages Slentz, Ciel, and FuzzBuster were selected for whole genome sequencing. All three bacteriophages belong to the family *Siphoviridae*. Surprisingly, Slentz and Ciel’s genomes were only 17,445 bp long and were classified as cluster EE bacteriophages. Cluster EE bacteriophages have the smallest genomes of any cluster of Actinobacteriophages and encode little else besides structural proteins. FuzzBuster’s genome was 54,844 bp long and was classified as a singleton with some similarity to cluster EI bacteriophages. Our class also performed an additional host-range experiment using *Microbacterium aerolatum*, *Microbacterium paraoxydans*, and *Microbacterium testaceum* obtained from the Hatfull laboratory. Excitingly, FuzzBuster and three other bacteriophages discovered in 2018 were able to infect *Microbacterium testaceum*. We were even more surprised to discover that two cluster EA2 bacteriophages sequenced in 2017 (Andromedas and ColaCorta) readily infected all *Microbacterium* species tested. These results and the cation dependency of Microbacteriophages demonstrating expanded host range will be discussed.