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2024 SEA Symposium Abstract

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Podo Parties with Phage Astartes: a New Subcluster EK2 Phage from Ohio

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Among the Microbacterium foliorum phages isolated by students from Miami University's MBI 223 (Bacteriophage Biology) class in Fall 2023 was Astartes. This lytic phage, isolated from a sample of dead leaves and foliage lying underneath a broken tree limb, was revealed by transmission electron microscopy to have podoviral morphology. Restriction analysis of Astartes' DNA was inconclusive. Astartes DNA was sent for sequencing, which revealed that it is a member of subcluster EK2 with a circularly permuted genome of 54,104 base pairs. Students in MBI 224 (Genome Annotation) have been annotating the Astartes genome. Autoannotation resulted in 57 putative genes, one of which is a dubious wraparound gene. The other 56 all encoded proteins that were identical or >90% similar to proteins from other phages of subcluster EK2. Overall, the genome of Astartes is most similar to those of Morrill and Atraxi. However, a segment that contains two genes for proteins of unknown function is replaced by a segment found in several other subcluster EK2 phages, illustrating the "mix and match" nature of phage recombination and evolution. Analysis of gene functions is ongoing. Subcluster EK2 phages are moderate in both size and genomic diversity, making them interesting subjects for study of phage genome evolution.