CONSIDER FOR TALK

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Host range of Bacillus phages

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The Bacillus group of bacteria is important to human health and agriculture due to the different pathogenic profiles of members of this genus. For example, *B.anthracis* is a human pathogen and important in bioterrorism research, while *B. thuringiensis* is an insect pathogen and of economic importance to agriculture. Students from several SEA PHAGES programs have been isolating and characterizing Bacillus phages for several years, primarily using *B. thuringiensis* subspecies Kurstaki , but also other Bacillus species, as the host bacteria. The host range of a phage is determined by its ability to bind carbohydrates and proteins on the surface of bacteria, leading to a productive infection and bacterial lysis. Last year, we joined forces to do parallel host range testing in each of our phage hunting courses. Combined, our Fall 2014 SEA PHAGES students tested 127 phages for ability to infect and lyse a common set of Bacillus isolates. We profiled phage infection in each of our classes, found both ‘narrow’ and ‘broad’ host range phages, and can characterize some of the bacteria species as relatively ‘permissive’ and ‘susceptible’. This knowledge can be used to select host bacteria for future courses, as well as inform our genomics analysis. Together, ~30 phages in this collection were sequenced, including 17 from this year. We are examining the comparative genomics of the tail and baseplate protein region, looking for long tail fiber and receptor binding protein homologs that might be useful for future research defining the phage-bacteria infection interaction, as well as predicting host range of future characterized phages.