

Characterizing Bacteriophage Host Range and Genetic Diversity

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Introduction

- Bacteriophages are viruses that infect bacteria.
- Bacteriophage can be found anywhere their bacterial host strain is found, such as soil and leaves.
- Little is known about bacteriophage genetic and ecological diversity.
- *Xanthomonas* is a genus of plant pathogenic bacteria that causes bacterial spot disease (Fig. 1) and was used as the host in this study.



Figure 1. Bacterial spot disease on peach leaves

Objectives

1. Isolate bacteriophage from *Xanthomonas* infected peach leaves.
2. Test host range of bacteriophage isolates.
3. Characterize genome of select bacteriophage isolates.

Methods

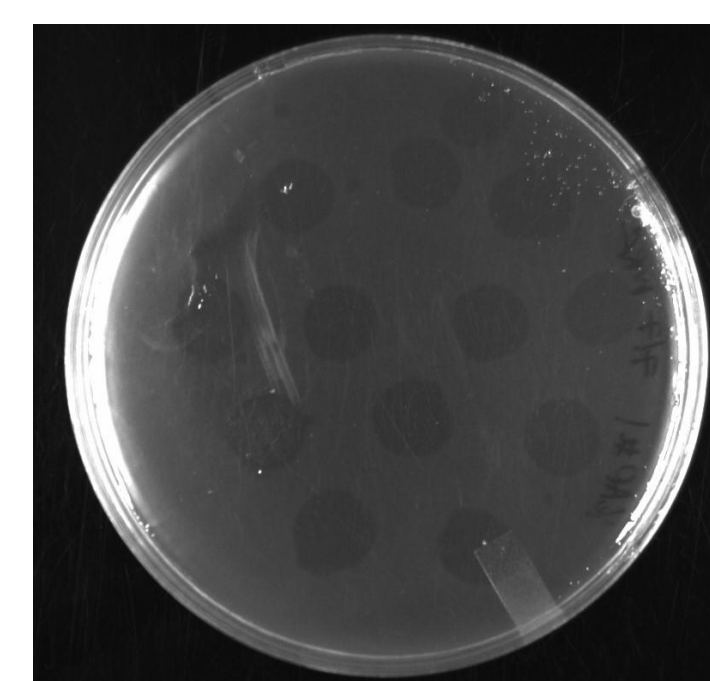
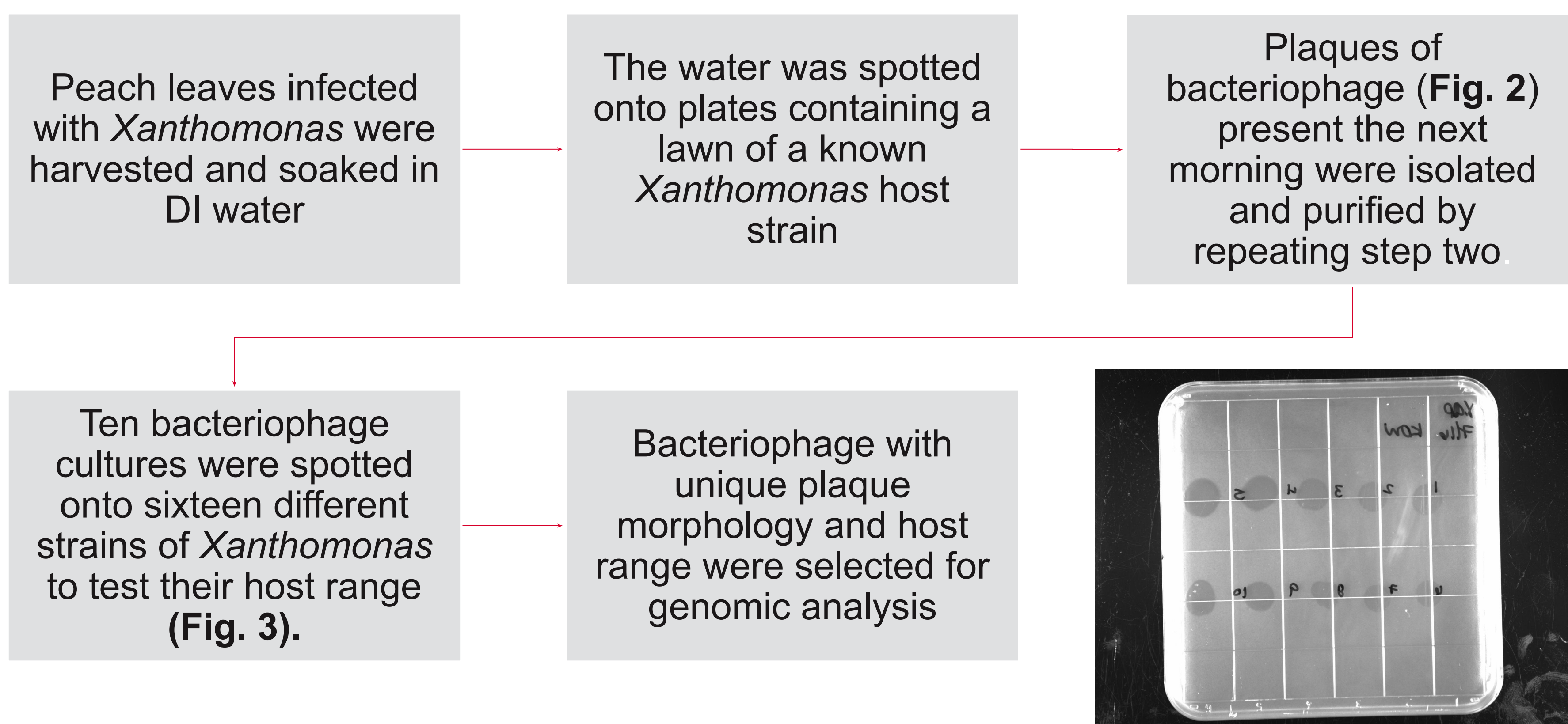


Figure 2. Bacteriophage plaques on lawn of *Xanthomonas*.

Figure 3. Example host range assay with 10 phage isolates plated on one bacterial host strain.

Results and Conclusions

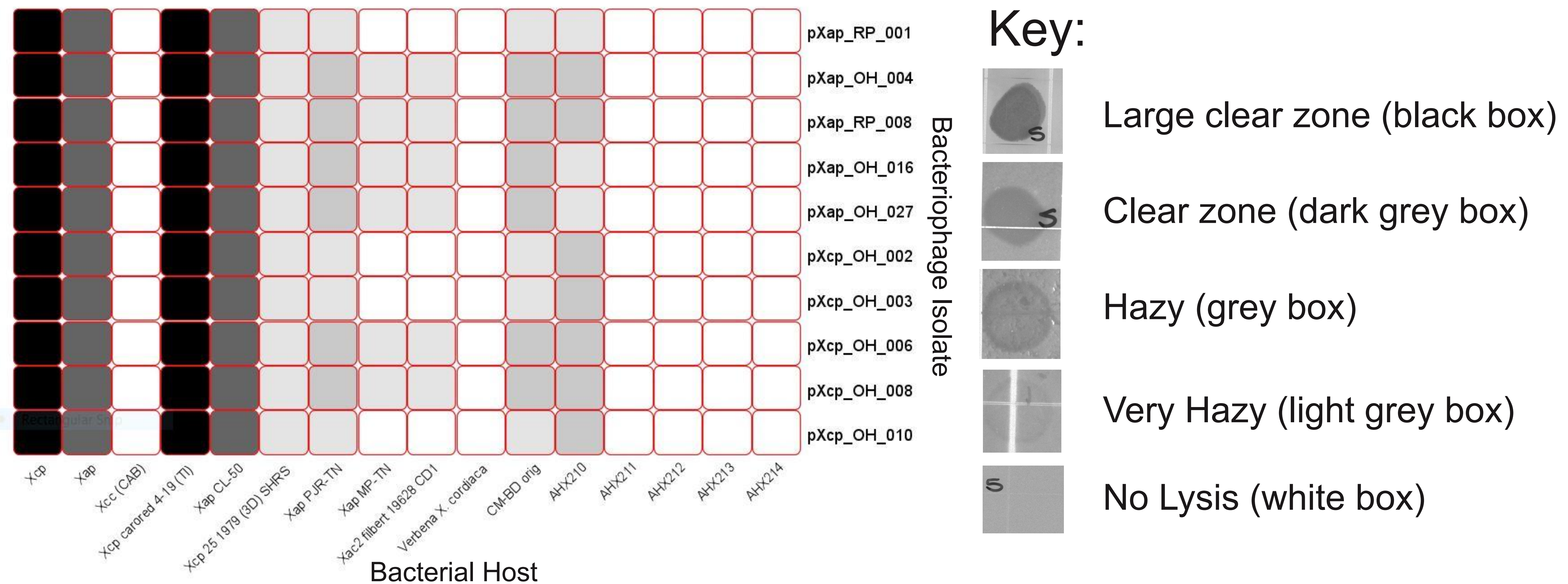


Figure 4. Host range assay for 10 bacteriophage isolates purified from peach leaves showing symptoms of bacterial spot. Bacteria included in host range assay include several strains of *Xanthomonas arboricola* pv. *pruni* along with other *Xanthomonas* spp.

- Initially, the protocol for isolating phage from leaf tissue was optimized for our lab conditions.
- A host range assay was performed utilizing **10** bacteriophage isolates and **16** bacterial hosts.
- The results in **Fig. 4** indicate that there are two distinct bacteriophages isolates with similar host range and plaque morphology.

Moving Forward

- DNA isolations are being performed on the two bacteriophage isolates identified in this study to analyze their genomes.
- Research on bacteriophage diversity associated with *Xanthomonas* host strains is being conducted using different cultivars of peach.
- In the future, this work will likely to be extended to other economically important crops and bacterial hosts.