

#18: A genetics approach to understanding the host-pathogen parasitic relationship of apple and *Erwinia amylovora*  
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Fire blight, caused by the bacterium *Erwinia amylovora*, is a destructive disease affecting apples and pears. This study seeks to elucidate the ability of auxotrophic *E. amylovora* mutants, which are unable to synthesize one or more of the biological molecules required for growth, to effectively induce disease, in comparison to the prototrophic wild type, which is fully capable of synthesizing all of the molecules required for growth. This comparison will reveal more about the parasitic relationship of *E. amylovora* to its host, specifically what types of biological molecules the bacteria are capable of scavenging from host tissues. In this work, over 5000 mutants were obtained via Tn5 mutagenesis of a Pennsylvania wild type strain, 6P1, and tested for auxotrophy on M9 minimal media plates and confirmed as auxotrophs in a secondary liquid media assay. Of the 5000 tested, approximately 115 were auxotrophic. Confirmed auxotrophic mutants were then inoculated in immature Gala apple fruits and monitored for fire blight symptom development. DNA was then isolated from each mutant in order to analyze the segments bearing the Tn5 mutated gene sequence and deduce the affected genes and their products. Future work will include inoculation of selected pathogenic auxotrophic mutants in 2 year old apple trees to compare disease development to that which occurs in immature fruits. This study will contribute to the understanding of *E. amylovora* parasitic nutrient acquisition by comparing biosynthetic pathways affected in pathogenic and non-pathogenic mutants, which should identify host molecules needed for bacterial growth and disease development.