

Title: Defining a Role for *Phytophthora* Cellulases

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Abstract:

The genus *Phytophthora* is aptly named the plant (*phyto*) destroyer (*phthora*). Members of this genus attack a wide range of plants, infecting root, stem and leaf tissues, resulting in the greatest overall damage of any plant pathogen. *Phytophthora* has been successful due to genome plasticity, and a chimaeric assembly of fungal, bacterial and plant-like attributes. Recent completion of genome sequencing on three *Phytophthora* species now allows for characterization of gene function with the potential to provide effective disease management.

We have focused on the annotation and functional testing of glycosyl hydrolases, commonly referred to as “cellulases”. Approximately 280 glycosyl hydrolase genes are present in *Phytophthora infestans*, many found in regions of gene duplication, with synteny across sequenced species. Specific studies on family 5 and family 12 glycosyl hydrolases revealed interesting differences in relation to their ability to modify specific cell wall targets, when tested in various *in planta* experiments.

A unique set of genes encoding cellulose binding domains, but no catalytic region, were identified and characterized as *Phytophthora* cell wall bound proteins. The potential application of the cellulose binding domains, and a plant encoded glycosyl hydrolase inhibitor protein, in plant disease suppression will be presented.