Investigating *Phytophthora infestans* Race, Virulence and Detection Strategies to Reduce Late Blight of Tomato

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Phytophthora infestans has been causing late blight disease in both tomato and potato plants and plaguing agricultural societies internationally since even before the infamous Irish Potato Famine in 1845. Despite its long history, researchers are still struggling to help growers with late blight today. This is partially due to the ability of *P. infestans* to evolve rapidly and overcome management strategies such as host resistance. To better understand the interactions between pathogen and host genotypes, a race study was conducted using 6 isolates of *P. infestans* and 7 different tomato varieties to determine differences in virulence and susceptibility, respectively. Leaflets were inoculated, and after a one-week incubation, lesions were measured and sporangia were quantified. Differences in both the virulence of *P. infestans* isolates and the susceptibility of tomato varieties were detected. A *P. infestans* field-detection assay was also conducted. Roto-rod spore traps were deployed in six field locations across New York State to detect airborne *P. infestans* sporangia prior to symptom development. Sample rods were collected twice weekly and analyzed using a commercial DNA extraction kit followed by quantitative PCR (qPCR). *P. infestans* DNA was detected from rods several times in early July near Geneva, NY, prior to symptom detection.