Monitoring emerging *Phytophthora ramorum* and *P. kernoviae* in Rhododendron

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Rapid, field-deployable assays such as loop-mediated isothermal amplification (LAMP) are critical for detecting nursery and forest pathogens like *Phytophthora ramorum* and *P.kernoviae* to prevent pathogen spread. We evaluated the specificity and sensitivity of previously published *P. ramorum* and *P. kernoviae* LAMP assays and developed a new LAMP assay for genus-level detection of *Phytophthora spp.* using DNA extracts and infected Rhododendron leaf samples. Sensitivity was measured for each assay by running serial dilutions of target DNA of the pathogen in the thermocycler and real-time LAMP. Products were visualized using colorimetric dyes, gel electrophoresis, on a microfluidic chip on a smartphone device, and as fluorescence curves. All methods can reliably detect 10-1pg/µl of target DNA. Real-time LAMP is being used to measure the target DNA concentration in infected leaf samples over time. The *P. ramorum* LAMP assay accurately detected 14 of 15 inoculated leaves after two days post inoculation. The specificity of the three LAMP reactions is under evaluation using DNA from other *Phytophthora spp.* found on hosts of *P. ramorum* and *P. kernoviae*. Our goal is to run the three LAMP assays together on one microfluidic chip to detect and monitor spread of these important *Phytophthora* species in forest and nursery settings.