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A new real-time loop-mediated isothermal amplification (LAMP) assay to rapidly detect *Phytophthora ramorum* and *P. lateralis* invasive plant pathogens

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An effective framework for early warning and rapid response is a crucial element to mitigate or prevent the ecological and economic impacts of invasive plant pathogens. Molecular detection of these pathogens is now preferred for its greater sensitivity and specificity respect to classical tools. These analyses are generally PCR-based and require a well-equipped lab. Significant advantages in terms of prompt response to threats might be obtained by using an on-site detection tool. A real-time monitoring LAMP-based method has been optimized for a rapid and sensitive detection of *P. ramorum* and *P. lateralis*, two quarantine pathogens that cause mortality on forest trees and ornamental plants in Europe and North America, by using the Genie[®] II system. The assay was able to recognize each pathogen with a high level of specificity and sensitivity also in plant tissues (to 4 pg μl^{-1} of DNA) in only 30 minutes. Great simplicity, sensitivity, specificity, and minimum required equipment make the LAMP assay ideal for application in the field and for routine plant testing at ports of entry. The use of portable and handled instruments allows a fast analysis of the collected sample reducing the diagnosis time and may have implications for disease management and for the control of *P. lateralis* and *P. ramorum*.