Portable LAMP (Loop mediated isothermal AMPlification): new molecular assays to detect invasive plant pathogens.

7th ESENIAS Workshop with Scientific Conference

Networking and Regional Cooperation Towards Invasive Alien Species Prevention and Management in Europe

28–30 March 2017
SOFIA, BULGARIA

Book of Abstracts

Sofia, Bulgaria
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Topic 5: Invasive alien species prevention and management

Early detection and rapid eradication, surveillance systems; risk assessment and horizon scanning; control measures; restoration of damaged ecosystems; education, citizen science, strategies, policy and legislation; IAS networks and information systems, databases, data planning and management

Portable LAMP (Loop mediated isothermal AMPlification): New molecular assays to detect invasive plant pathogens

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Plant health emergencies due to invasive quarantine pathogens are increasing in Europe and in other countries. The threat that these pathogens could represent for natural forest ecosystems and urban environments is mainly connected with their possible spread into new areas without susceptible hosts and ecological suitable conditions. Here they could cause huge ecosystem changes and biodiversity losses. In order to contain, prevent and manage environmental and economic damages that these pathogens may cause some specific and sensitive diagnostic tools are necessary. It is recognised that effective plans for both early warning and rapid response are a crucial element of any policy aimed at reducing the impacts of biological invasions or preventing the establishment of pathogens, such as the invasive species. Hence, advantages might be gained by moving testing closer to the site of sampling, thereby reducing delays. PCR-based methods are to date favoured for their high sensitivity and specificity, but they require a well-equipped laboratory for analysing the samples. For this purpose, certain diagnostic assays based on LAMP (Loop mediated isothermal amplification) were developed and optimised on the portable instrument Genie II (Optigene, UK). The assays, based on specific target DNA regions, enable recognising target pathogens with high specificity and sensitivity. Indeed, these assays have shown the ability to distinguish each pathogen with a characteristic melting temperature and to detect DNA in a quantity as low as 0.128 pg/, l. These results equal to those obtained with the qPCR compared diagnostic assays. Using this method for detecting quarantine pathogens, both on symptomatic and asymptomatic samples, could help in checking imported and exported live plants for planting, thus limiting the uncontrolled spread of invasive pathogens. Furthermore, the great simplicity, sensitivity and specificity, high speed (only 30 min) and the minimum equipment required make the assay ideal for its application in the field and for routine plant testing both in cities and forests.

Key words: Early detection, molecular diagnosis, invasive quarantine plant pathogens detection.

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