



SIAMOIS

Smart and Innovative monitoring of airborne fungal invaders by molecular methods

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Context — Emerging diseases are increasing liability for sustainable wood production and stability of forest ecosystems. They may be related to climate warming or to invasive organisms moved by the increasing world trade. Dealing with those treats requires improved surveillance systems.

Objectives — New molecular methods coupled with well-established spore trapping methodologies offers opportunities for surveying forest fungal communities at large scales. The SIAMOIS project aims to test these opportunities, taking advantage of a Europe-wide network of aerobiological captors established to monitor human allergenic particles (RNSA network in France).

Approaches — A pathogen-specific approach will target both important forest fungal diseases suitable as model such as Ash dieback and a short list of regulated fungal pathogens reported in restricted areas of France. For these diseases, we will derive severity maps at the scale of France from available forest health surveillance data. Inoculum load of the studied pathogens in captors selected on disease impact gradients at periods suitable for the pathogens sporulation will then be compared to the disease severity as observed by the surveillance system. A none species targeted approach will also be tested in SIAMOIS using third-generation high throughput sequencing device MinIon to characterize the entire community of forest fungal pathogens spread by airborne spores and assess whether species of interest are being reliably detected.

Expected results and impacts — This work will enable us to determine whether forest disease outbreaks may be monitored using the RNSA network. The use of a Europe-wide network of aerobiological captors of allergenic particles would allow to develop a standardized system enabling a strongly improved characterization of forest pathogens distribution at the continental scale. At regional scale, the tool could allow improving and optimizing field surveillance work and decision making in the field of forest management.