Anticipating and understanding new Xylella fastidiosa epidemics across European landscapes; insights from remote sensing and network analysis.

Tuesday, July 31, 2018
15:00 - 15:20
Hynes Convention Center - Room 312

Europe's major *X. fastidiosa* outbreaks have progressed steadily in the past years as data on the bacterial strains causing them, and on the host range and vectors of the pathogen in various regions, became available. The initial uncertainty around these critical epidemiological aspects of the *X. fastidiosa* invasions hampered estimates of their rate and reach should eradication or containment efforts fail. We explored whether network analysis could help circumvent known knowledge gaps in *X. fastidiosa* epidemiology; Relying only on distribution maps of a known host plant (>60 000 olive groves), and the dispersal abilities of a putative vector, we gained network-based insights into the effort required for eradication or containment of the pathogen in southern Italy, and into opportunities to optimize pest management efforts at the landscapes scale. Early detection of new foci play a critical role in ensuring such efforts are efficient. Hyperspectral and thermal remote sensing, at spatial resolutions fine enough to delineate tree crowns, provide estimates of several plant functional traits in individual trees. After coordinated aircraft and field campaigns, we found that based on these traits, olive trees with *X. fastidiosa* infection symptoms can be detected and mapped with >80% accuracy. Furthermore, we found strong evidence that they, in some cases, allow the identification of *X. fastidiosa* affected trees weeks to months before they developed visible symptoms.

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