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Advanced monitoring techniques

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Gallipoli (Italy), October 2013

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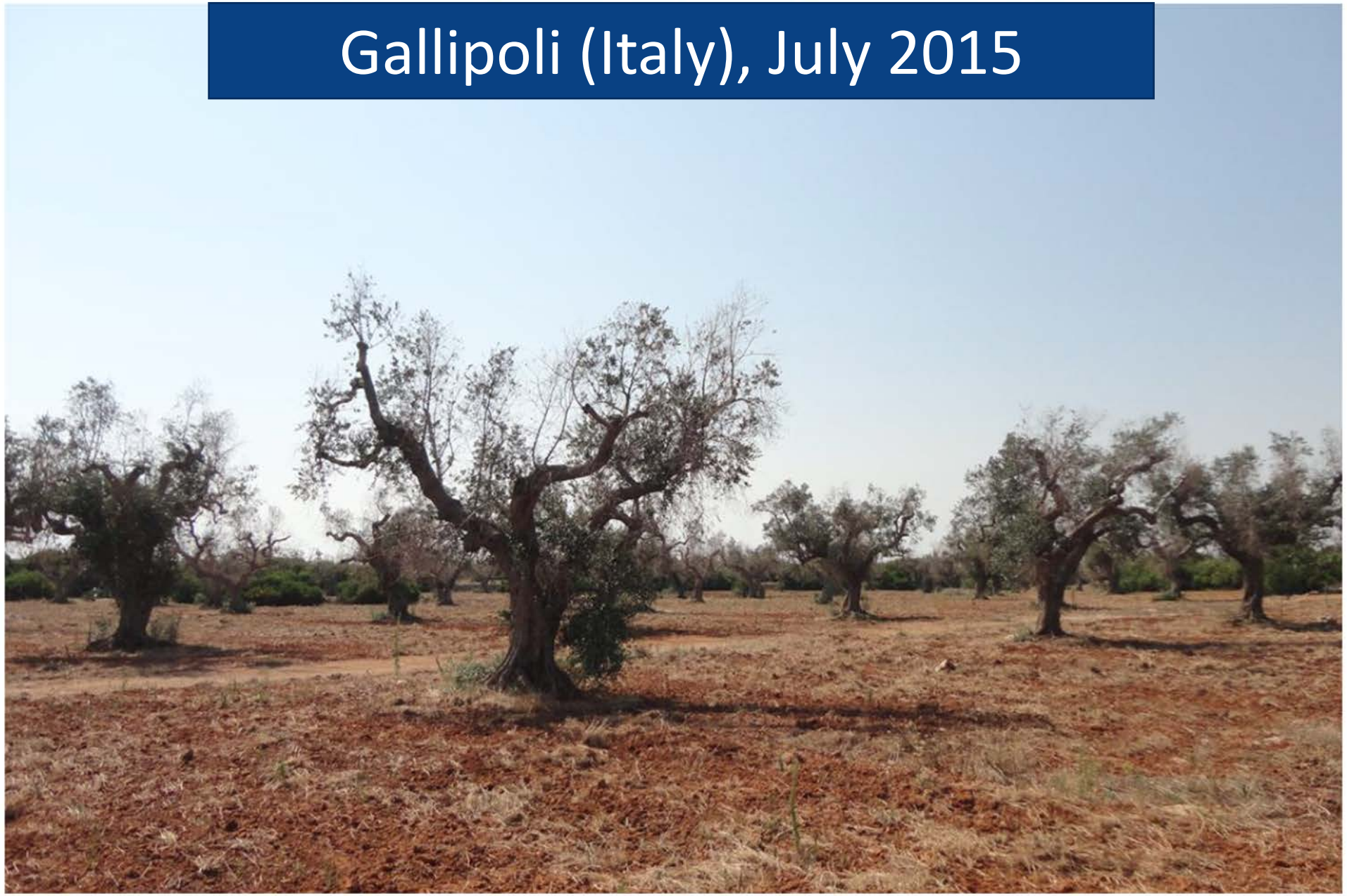
Gallipoli (Italy), July 2015



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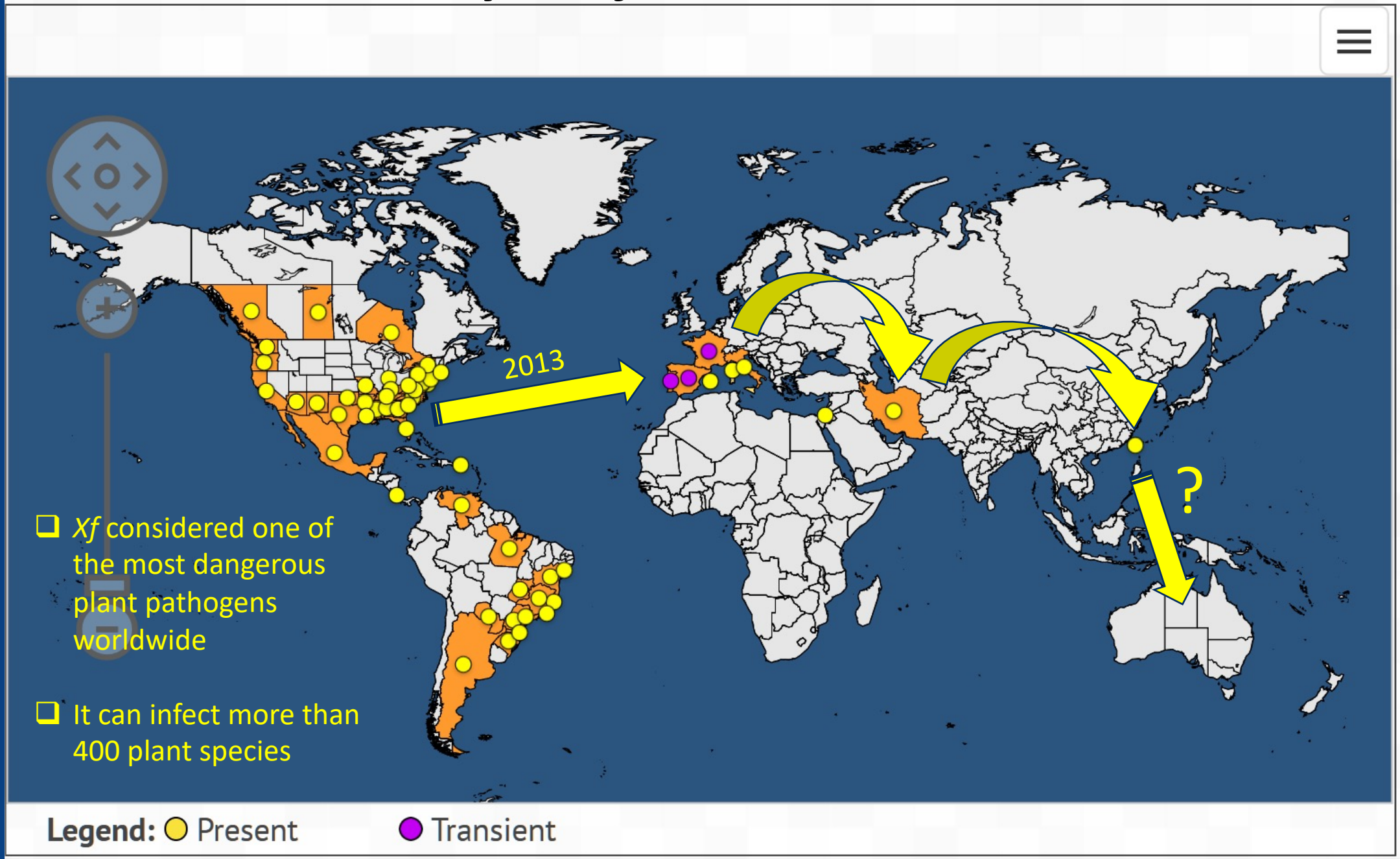
Distribution

Xylella fastidiosa

Last updated: 2021-09-23



- *Xf* considered one of the most dangerous plant pathogens worldwide
- It can infect more than 400 plant species

Top plant pests and diseases – Australia

Xylella fastidiosa

- The greatest threat worldwide
- It can infect over 550 plant species → major transboundary plant pest
- Modelling estimates up to €5.2 billion of losses per year in the olive sector alone

→ Considered a global epidemic

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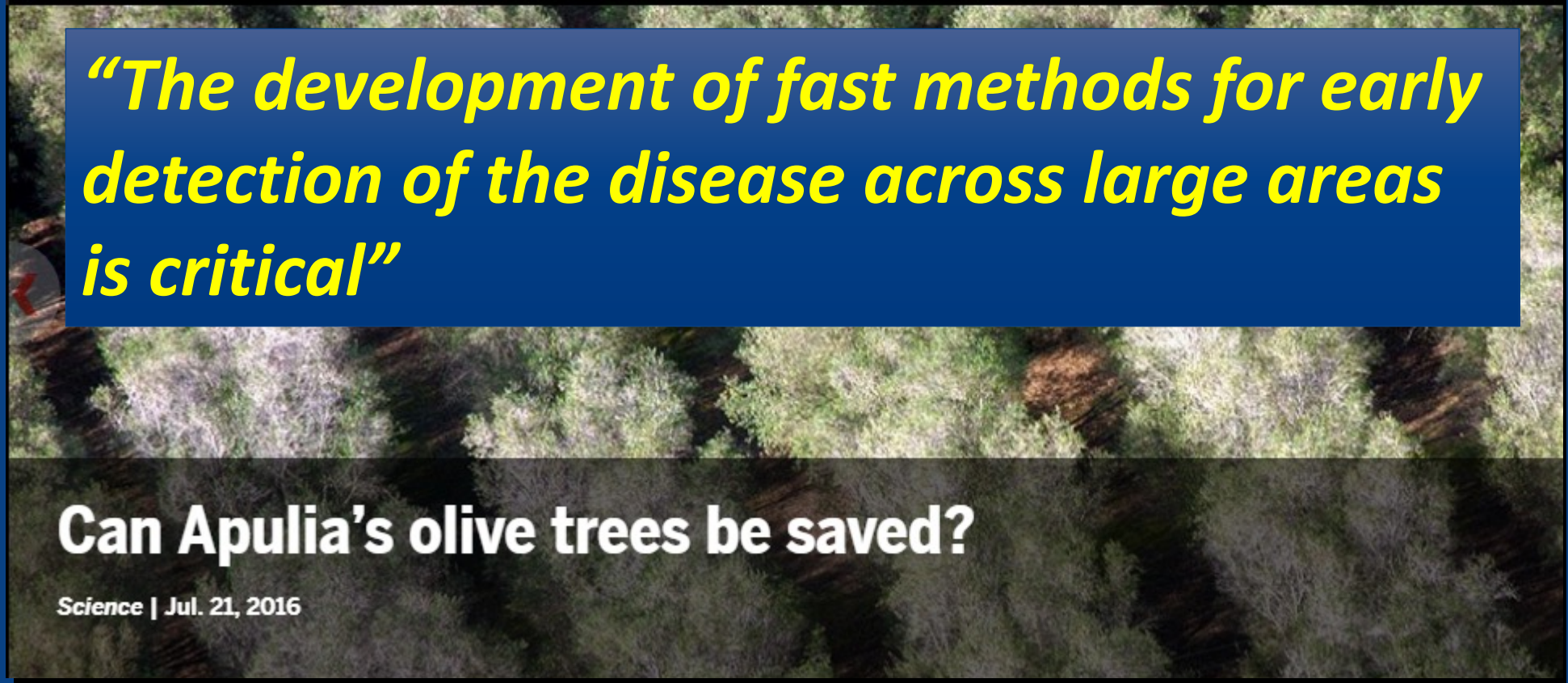
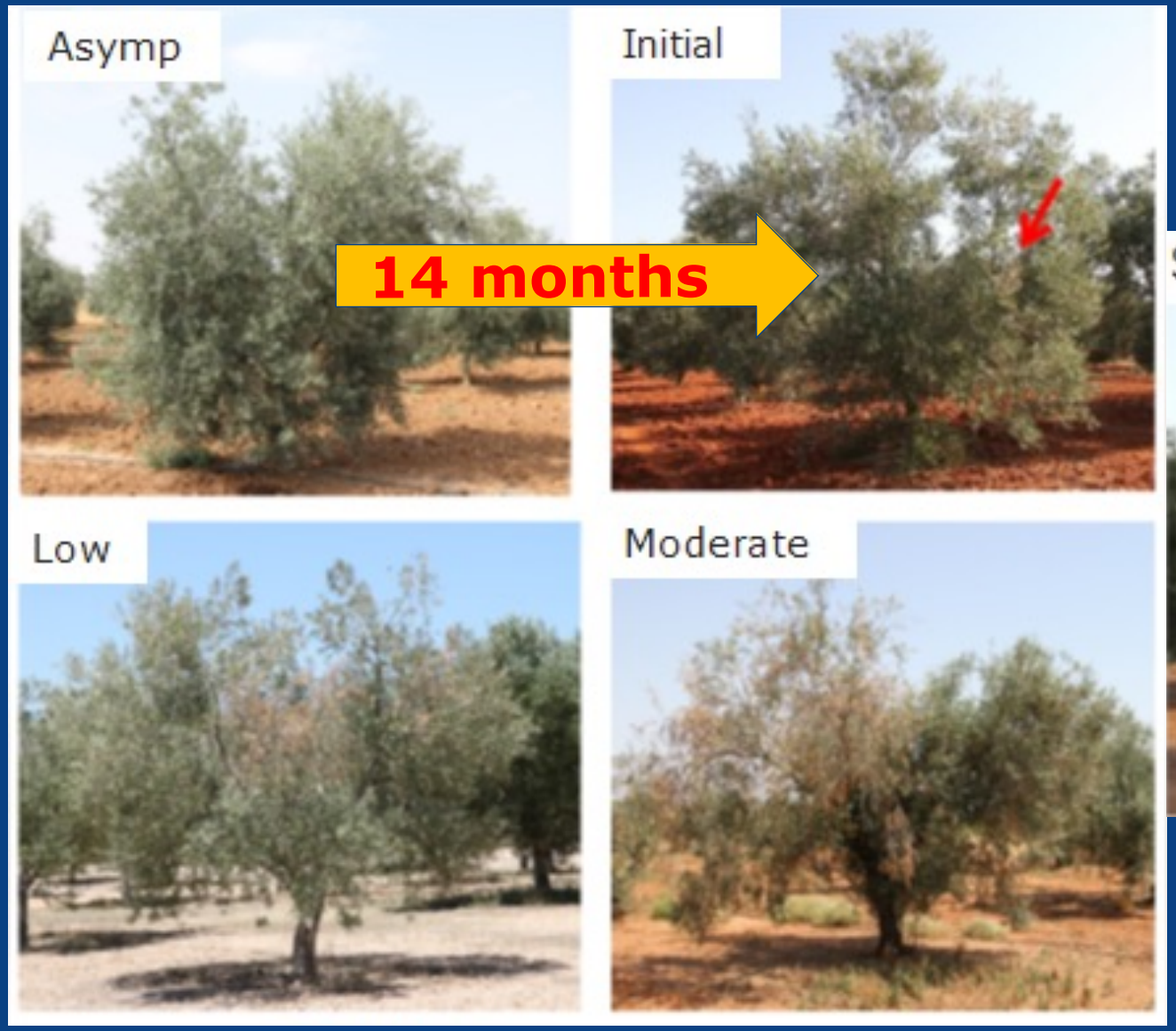
"The development of fast methods for early detection of the disease across large areas is critical"



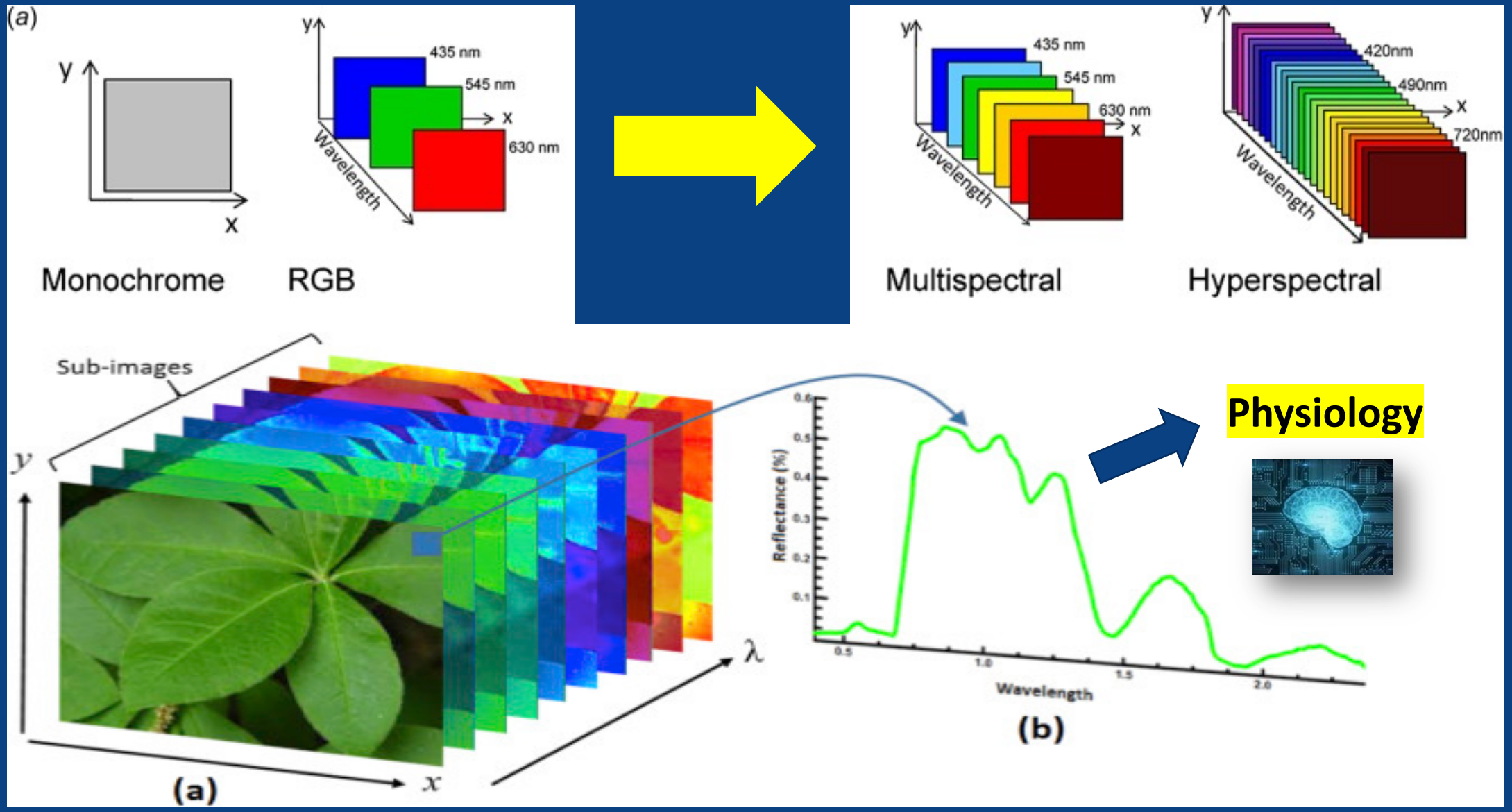
Can Apulia's olive trees be saved?

Science | Jul. 21, 2016

Pre-visual (asymptomatic) detection



Imaging Spectroscopy



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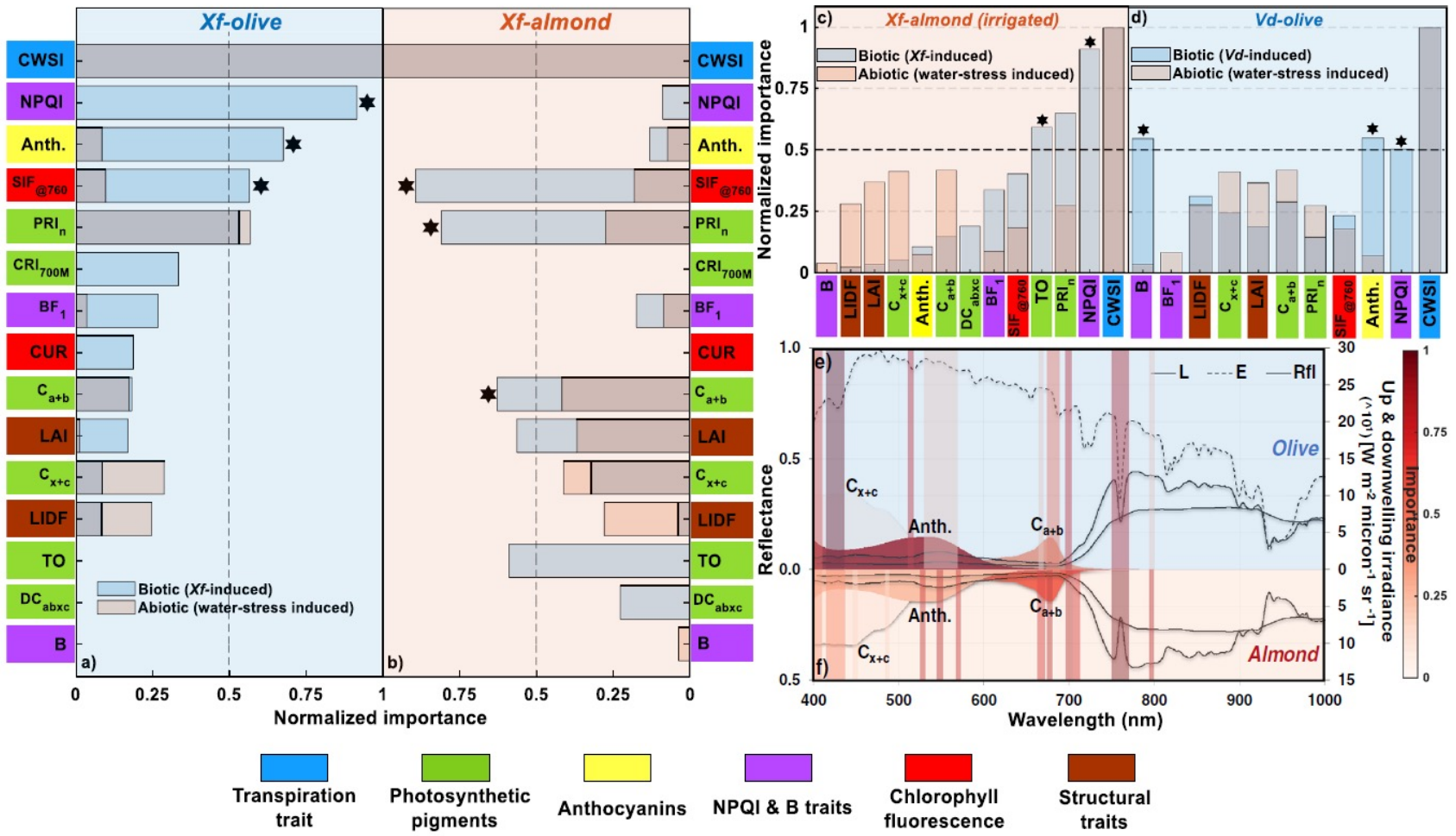
Specific spectral-based RS indicators across species *almond vs olive* and across pathogens *Xf* vs *Vd*

Accuracy > 92%

NATURE COMMUNICATIONS | https://doi.org/10.1038/s41467-021-26335-3



Zarco-Tejada *et al*. (2021)

Conclusions

1. Progress made is the last 20 years on assessing hyperspectral and thermal remote sensing for biotic-induced stress detection across species (OA>0.8-0.9; *k*>0.6)

2. Drones (~hundreds of hectares) and piloted aircraft (~thousands of hectares) *should* carry hyperspectral and thermal technology for asymptomatic detection

3. Satellite sensors more suited for advanced severity detection & monitoring

4. Should avoid limitations to carry hyperspectral imagers by drone technology

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