Agri-Food and Biosciences Institute

Xylella fastidiosa – history and science

Dr Richard O Hanlon

Grassland and Plant Science Branch

Xylella stakeholders seminar

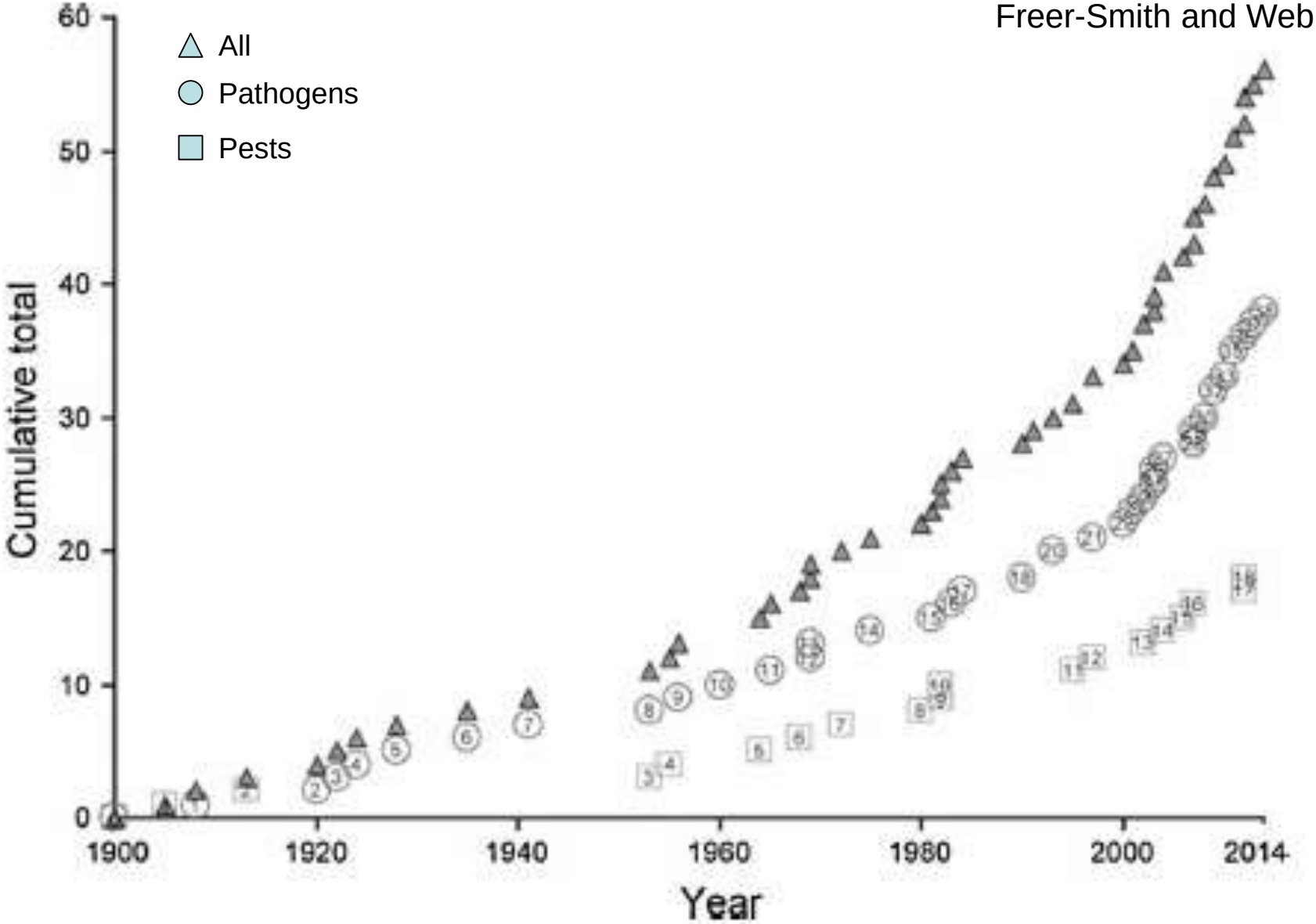
28/11/17

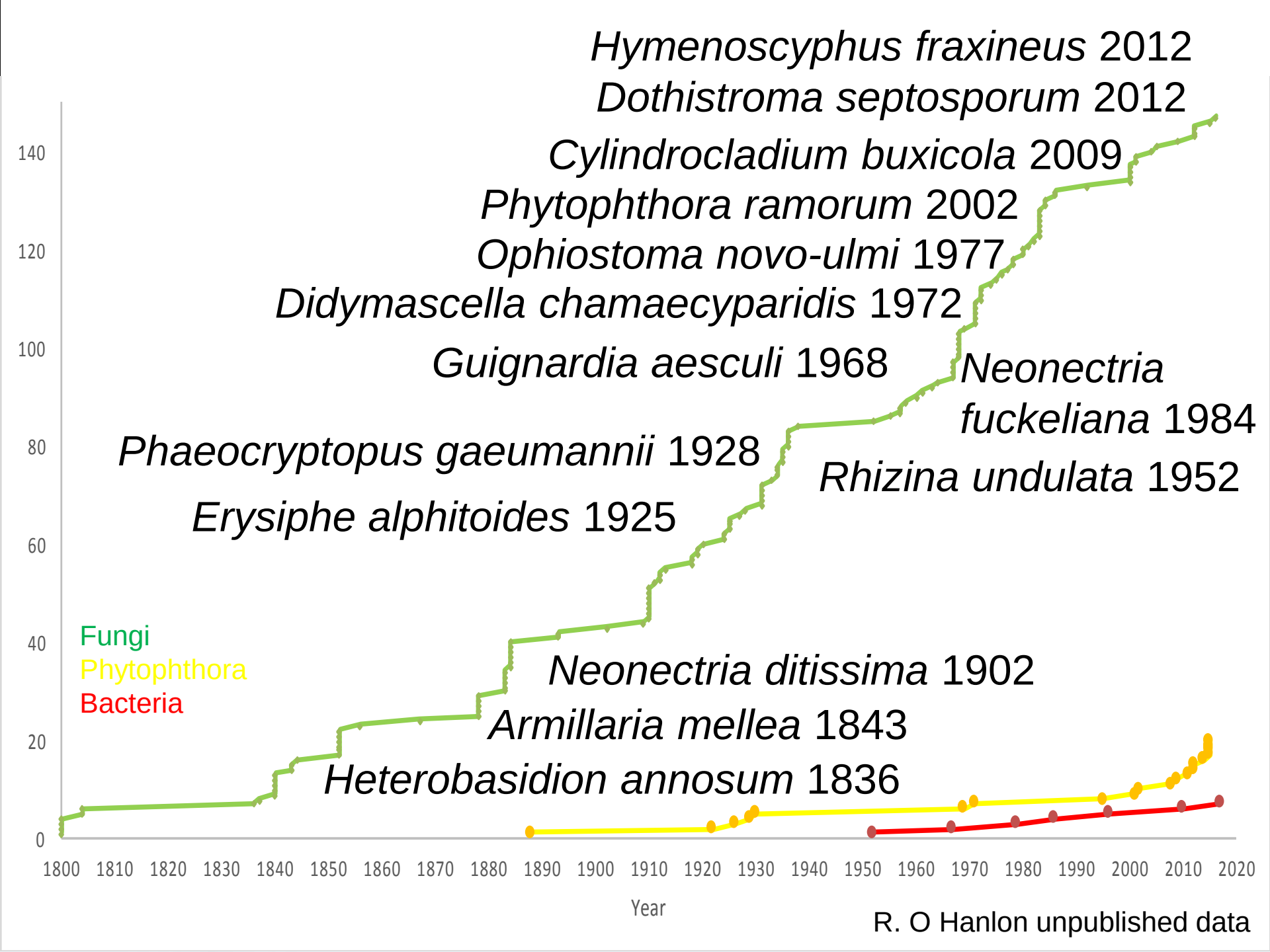
Plant health under threat

- Ever increasing numbers of new pests
- UK Plant health risk register (984) adding ca. 5 per month

New pests invasions in Britain

Freer-Smith and Webber 2015

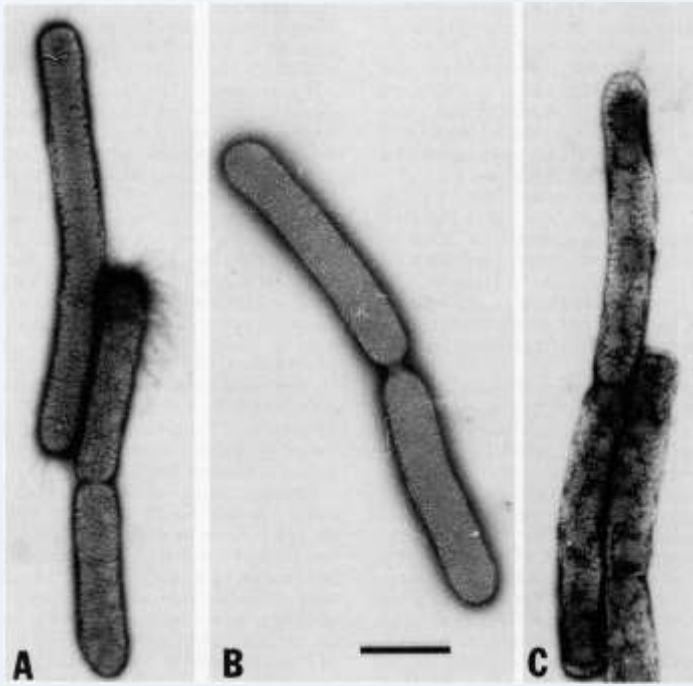




R. O Hanlon unpublished data

Xylella fastidiosa

- Bacterium described in 1987
- Colonises xylem of plant, spread by sap feeding insect
- 359 host species in 75 families of plants
  - Subsp. multiplex- Elm, oak, sycamore, Polygala
  - Subsp. fastidiosa - nerium
  - Subsp. pauca – olive
  - Subsp. Sandyi - coffee



Oleander leaf scorch

Scorch and wilt symptoms on *Polygala*

Scorch symptoms on olive

Scorch symptoms on almond


Scorch symptoms on oak
5549198

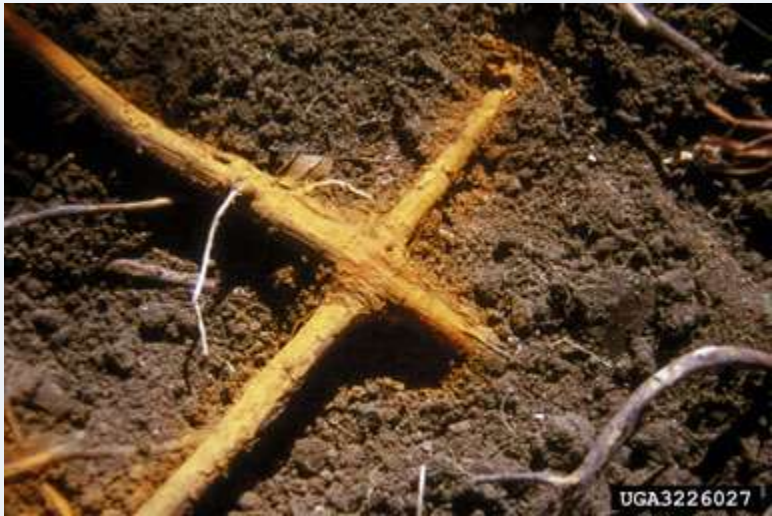
Xylella in plant xylem cells

Transmission

Spittle bug

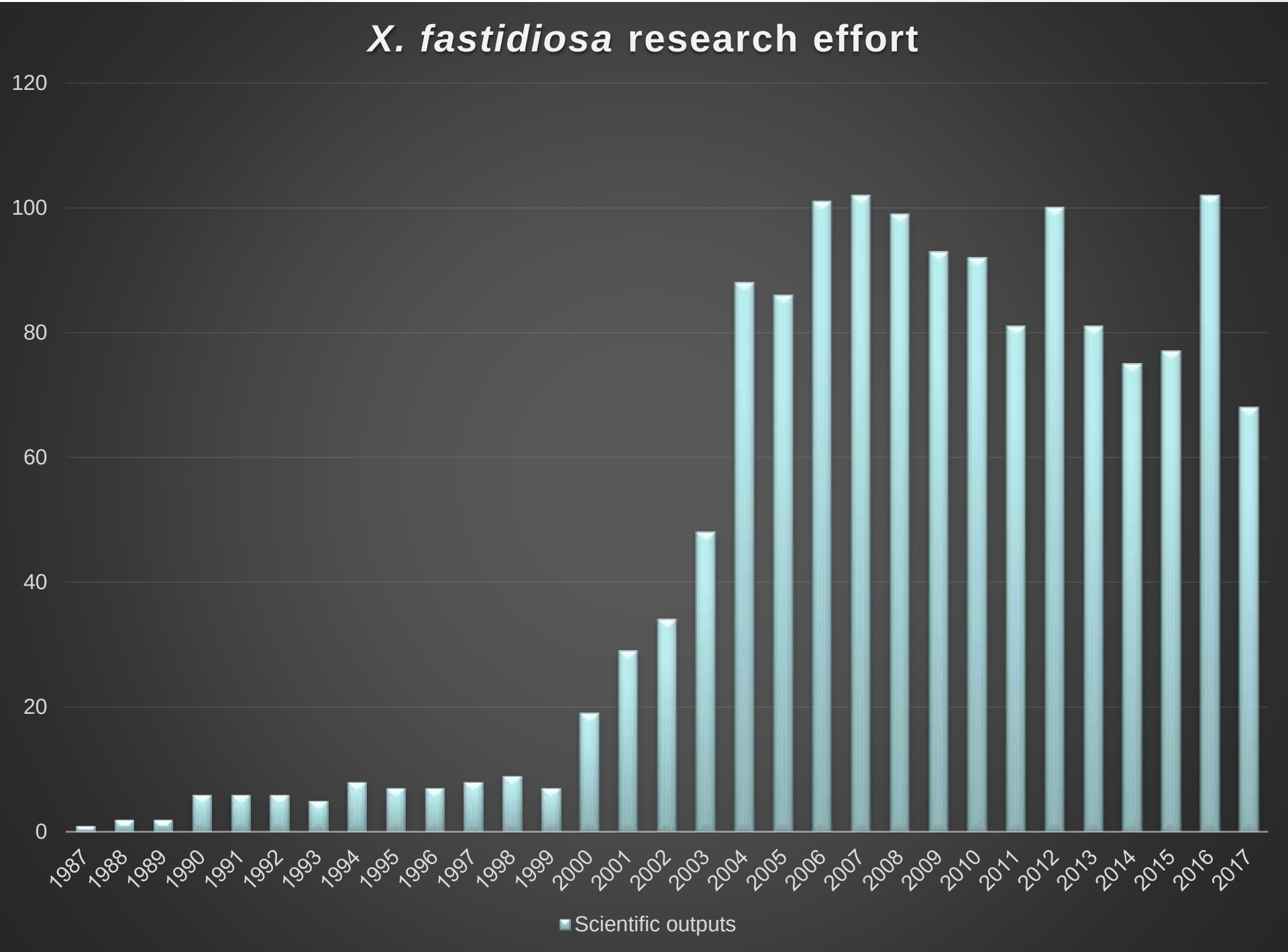
Leaf hopper

Common frog hopper



Root grafting

At least 14 potential vectors


X. fastidiosa research effort
120
100
80
60
40
20
0
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Scientific outputs

X. fastidiosa capabilities

articles

The genome sequence of the plant pathogen *Xylella fastidiosa*

The *Xylella fastidiosa* Consortium of the Organization for Nucleotide Sequencing and Analysis*, São Paulo, Brazil

** A full list of authors appears at the end of this paper*

- Recombines to infect new hosts
  - Mulberry in DC.
- Asymptomatic infection
- Host defence avoidance
- Adhesion
- Cell wall degradation
- Low host specificity

afbi Agri-Food and Biosciences Institute

Risk to NI

- Climate not perfect for pathogen
- Vectors do not overwinter as adults
- Slow geographic spread

NI Plant Health Risk Register No. 117

Current Mitigations show / hide

Key mitigation for pest

EU regulated pest

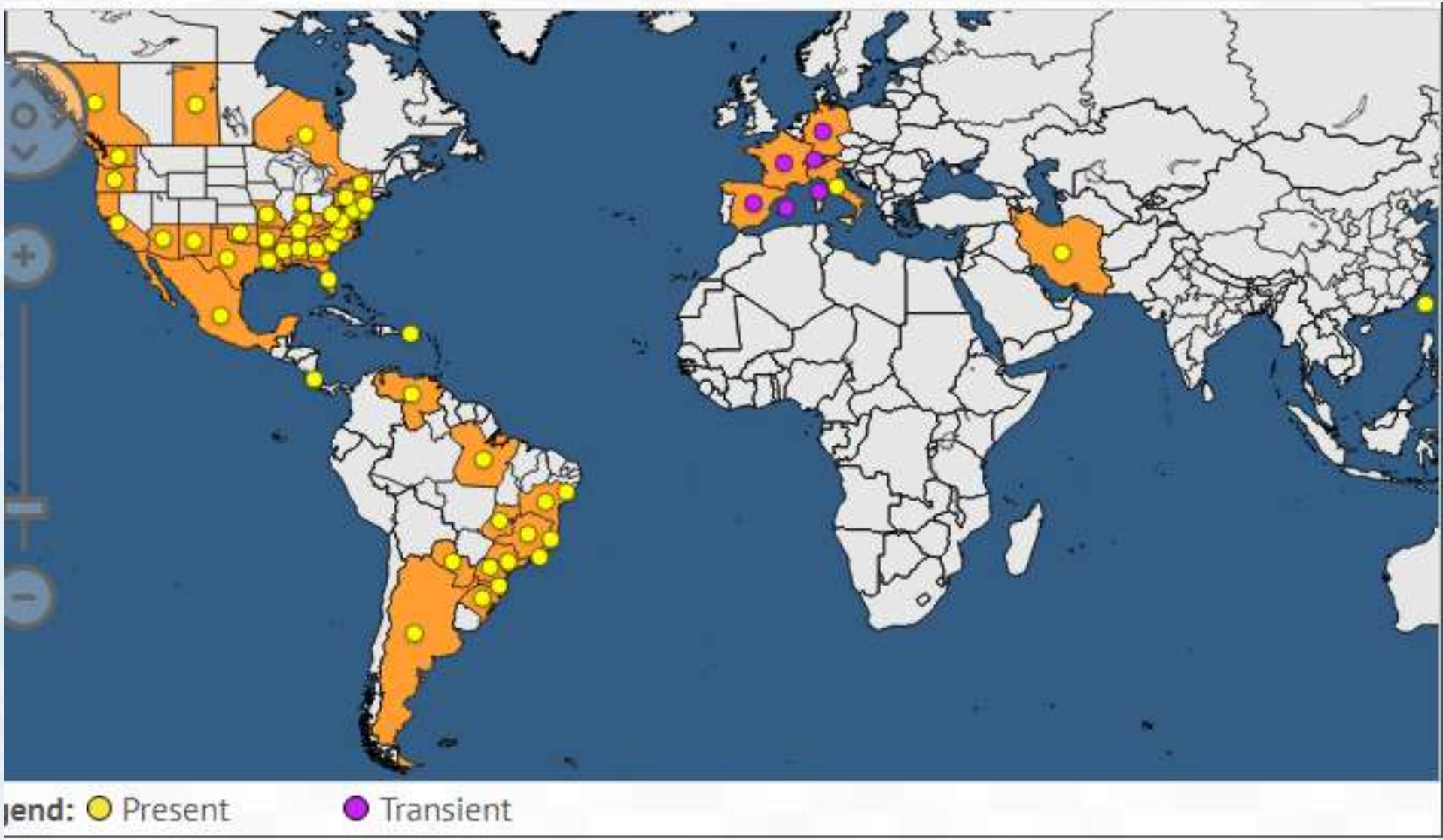
Regulation	✔
Surveillance	✖
Industry Scheme	✖
Contingency Plan	✖
Awareness	✔
Research	✔

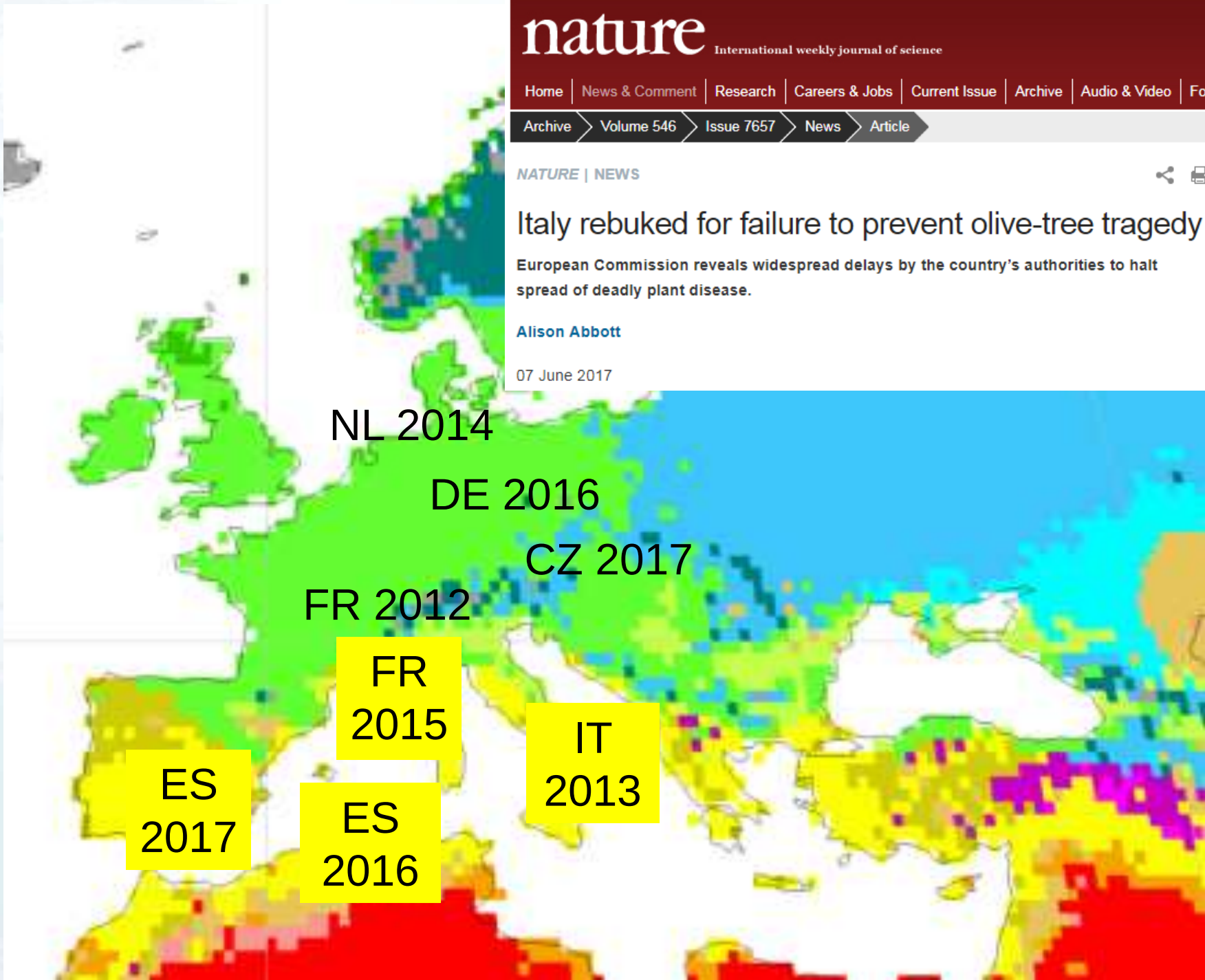
Mitigated Risks show / hide

Likelihood [1 - 5]	3
Spread [1 - 5]	3
Impact [1 - 5]	4
Value at Risk [1 - 5]	5
Likelihood x Impact [1 - 25]	12
UK Relative Risk Rating [1 - 125]	60

afbi Agri-Food and Biosciences Institute

Global distribution





nature International weekly journal of science

NATURE | NEWS

Italy rebuked for failure to prevent olive-tree tragedy

European Commission reveals widespread delays by the country's authorities to halt spread of deadly plant disease.

Alison Abbott

07 June 2017

Italy

- 2010 - Mortality of olive noted, no cause identified
- 2013 - olive, almond and oleander planted in South Italy infected
- 2014 - CoDiRo strain linked to Costa Rican *Xylella* population

France

- 2012 - coffee
  - plants destroyed. Facility decontaminated
- 2015 - Subsp multiplex on *Polygala myrtifolia* hedge in Corsica
  - Further sampling revealed more disease locations, several host species. Subsp. pauca and sandyi also detected
- 2015 - subsp multiplex on *Polygala myrtifolia* in Nice. Also Spanish broom and lavender found infected.

Switzerland

- 2015 - subsp. sandyi and subsp. pauca on coffee imported

Netherlands

- 2014 – Coffee. Some plants delivered to other MS
- 2014 – coffee. Large consignment destroyed

afbi Agri-Food and Biosciences Institute

Germany

- 2016 - Subsp *fastidiosa* on *oleander* in glasshouse
- Several potential vectors identified
- Several nurseries, gardening companies and forestry service providers affected

afbi Agri-Food and Biosciences Institute

Spain

- 2016 - Subsp fastidiosa on wild cherry on Balearic islands
  - Many positives across numerous hosts
  - Subsp multiplex, pauca – indicate several introductions. 80, 50, 90% of Balearic islands considered buffer zones
- 2017 - found in Alicante (mainland ES) almond orchard

- *Fraxinus angustifolia*, Mallorca, Spain

Czech republic

- 2017 on *Polygala myrtifolia* imported from Spain

High risk trades

High risk hosts	High risk EU regions
Polygala myrtifolia	Spain, Mallorca, Ibiza, Italy, France
Olea europaea	Italy, Mallorca
Rosmarinus officinalis	Germany, Italy, France, Mallorca
Lavandula spp.	Italy, France
Prunus spp.	Italy, Mallorca
Nerium oleander	Germany, Italy, Mallorca, Ibiza
Coffea	Netherlands, France

afbi Agri-Food and Biosciences Institute

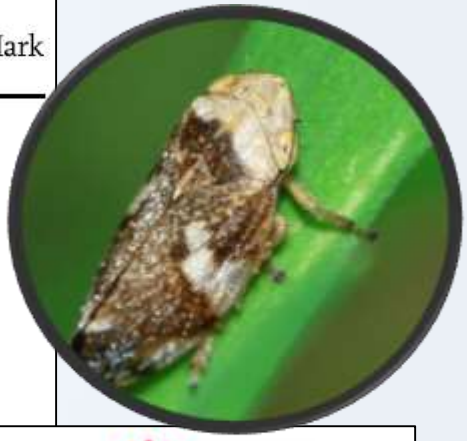
Biol Invasions
DOI 10.1007/s10530-017-1393-5

CrossMark

ORIGINAL PAPER

Modelling the spread and control of *Xylella fastidiosa* in the early stages of invasion in Apulia, Italy

Steven M. White · James M. Bullock · Danny A. P. Hooftman · Daniel S. Chapman



SCIENTIFIC REPORTS

OPEN

Network analysis reveals why *Xylella fastidiosa* will persist in Europe

Very difficult to eradicate because of infected weeds, and plentiful vectors

afbi Agri-Food and Biosciences Institute

More info

- DAERA website
- Ponte project
- NFU
- DEFRA factsheet

efsa
European Food Safety Authority

POnTE
PestOrganisms ThreateningEurope

Department of
Agriculture, Environment and Rural Affairs

XF ACTORS

afbi
Agri-Food and Biosciences Institute