

# Managing *Phytophthora* threats in horticulture and the wider environment

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atp1

## Fighting the SOD that kills our national tree

Editor's Choice

Most Viewed



'I had just been abused by a member

## Farming Independent

### Living with Ash Dieback: Scientists concede eradication of disease wreaking havoc on our ash trees no longer feasible

DIG  
TRA  
FIVE

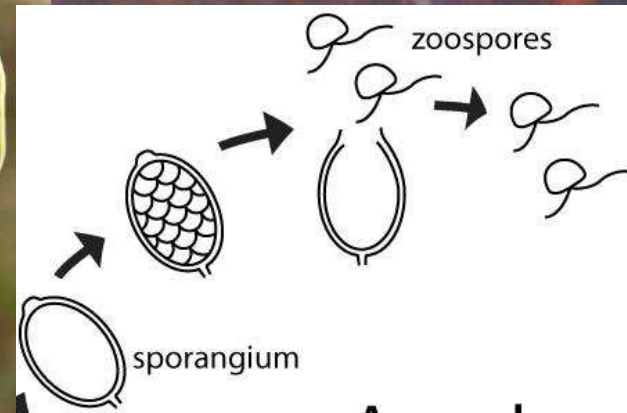
**2016 survey (D. Burgess AFBI)**  
**81% (n=914) had not heard of a plant disease**  
**70% do not regularly clean footwear**  
**Tree Check (<1% familiar)**

# *Phytophthora* biology

- Microorganism
- 27 species in Ireland, 19 non-native
- Needs mild wet/damp conditions



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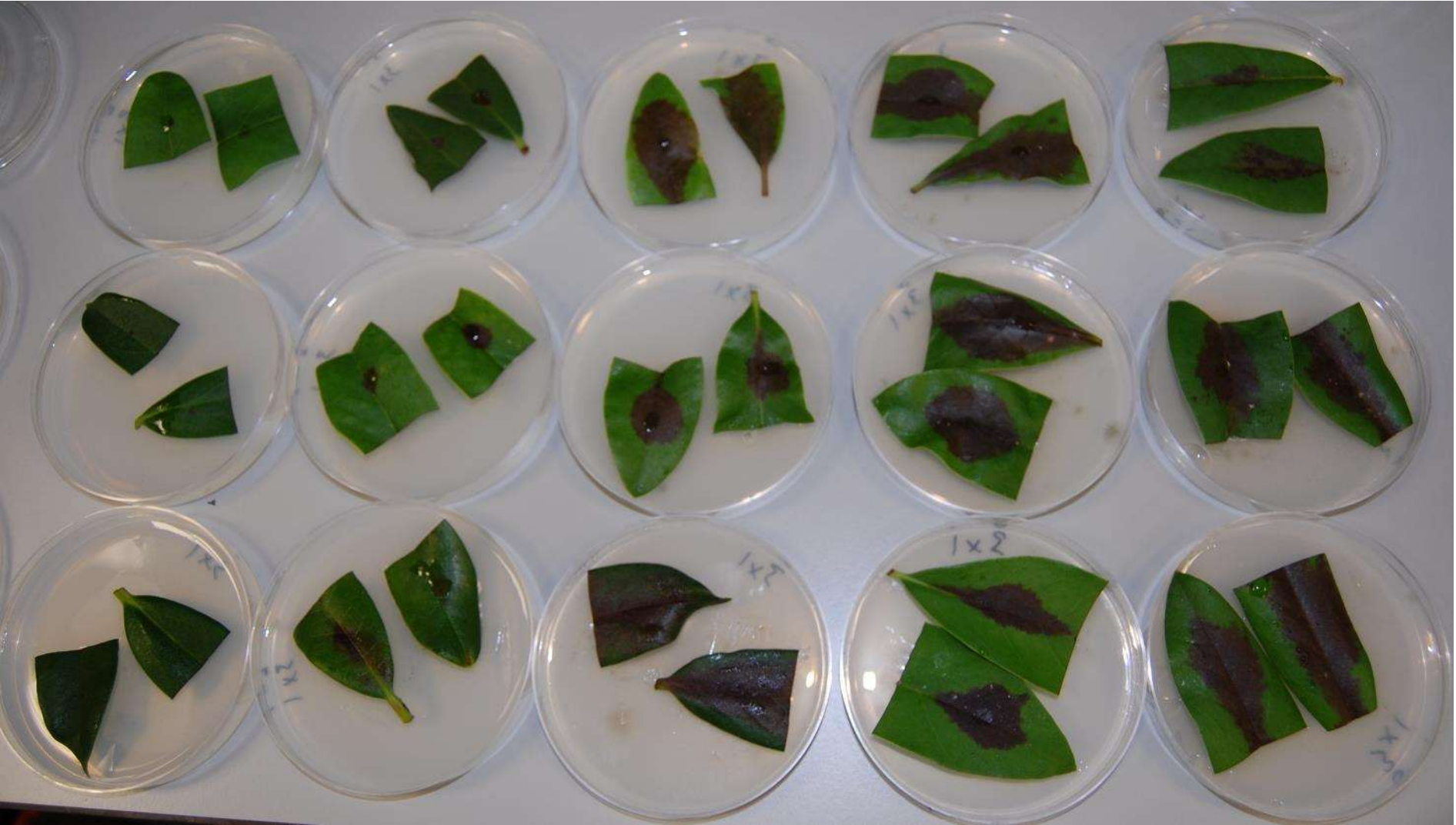
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# *Phytophthora* covert warfare

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Carbohydrate breakdown proteins

Elicitins

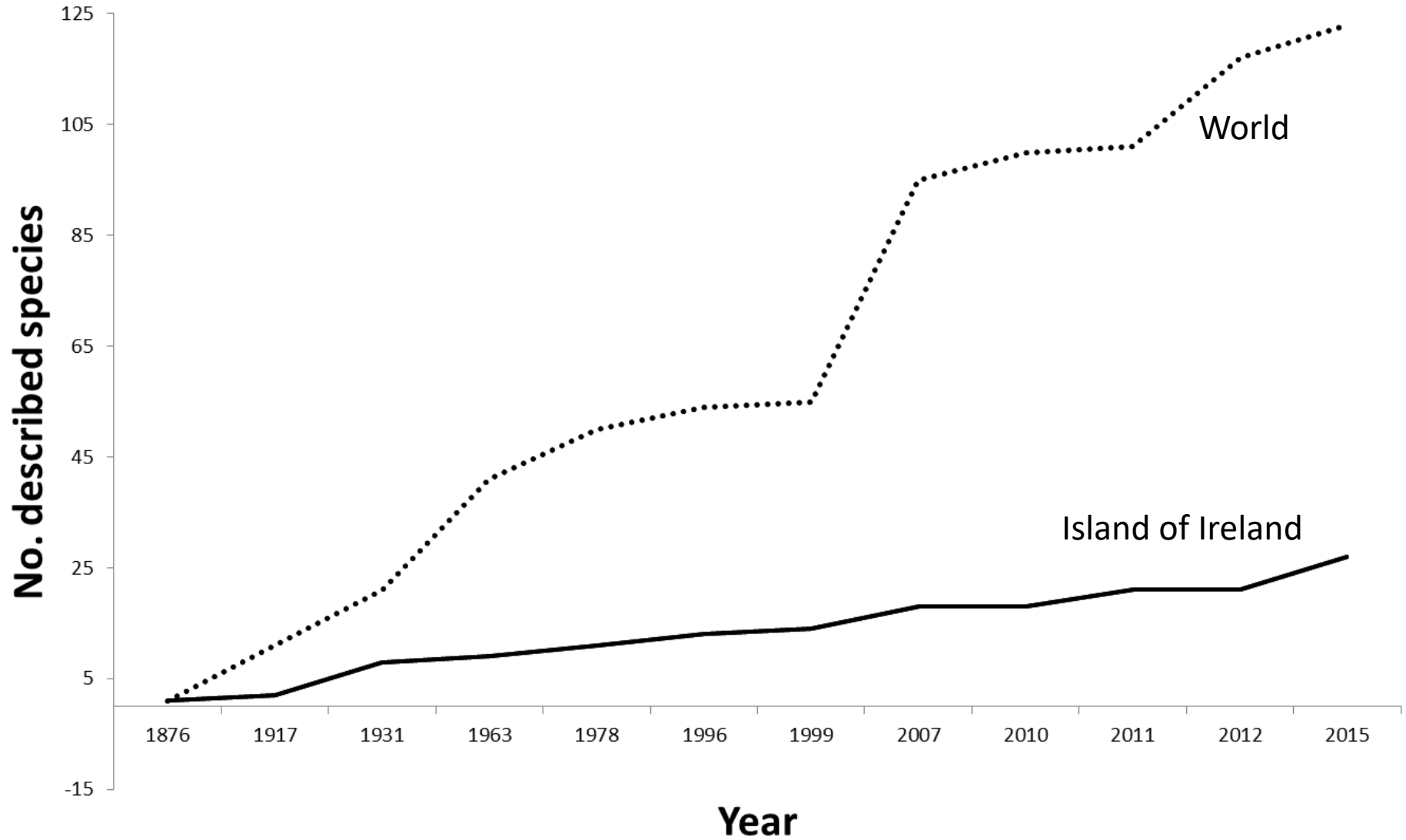
RLxR effectors

Proteases



CRN proteins

# Unknown *Phytophthora* diversity



# Spread of *Phytophthora* in the plant trade?

*P. ramorum* interceptions in Europe (2002-2010)

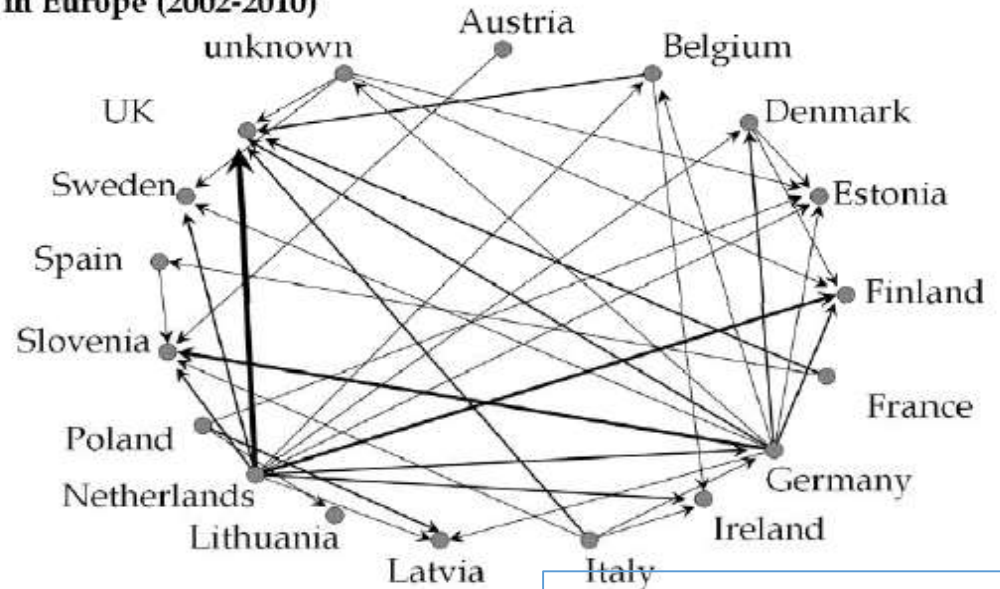


image from Pautasso 2013



Taxa	Host	Other host/s	Trade	Non-trade
<i>P. ×alni</i>	<i>Alnus</i>			
<i>P. cactorum</i> *	<i>Rhododendron</i>	<i>Fragaria</i>		
<i>P. cambivora</i> *	<i>Fagus</i>	Stream		
<i>P. chlamydospora</i>	Stream	+4		
<i>P. cinnamomi</i> *	Soil	<i>Vaccinium</i>		
<i>P. cryptogea</i> *	Soil			
<i>P. gonapodyides</i>	<i>Fagus</i>	+3		
<i>P. hibernalis</i>	<i>Rhododendron</i>	+2		
<i>P. kernoviae</i>	<i>Drimys</i>	+2		
<i>P. lacustris</i>	Soil	Stream		
<i>P. lateralis</i>	<i>Chamaecyparis</i>			
<i>P. megasperma</i>	Soil			
<i>P. mississippiae</i>	Soil			
<i>P. plurivora</i>	<i>Pieris</i>	+2		
<i>P. pseudosyringae</i>	<i>Fagus</i>			
<i>P. ramorum</i> *	<i>Larix</i>	+31		
<i>P. syringae</i>	<i>Rhododendron</i>	+5		
<i>P. uniformis</i>	<i>Alnus</i>			
<i>P. taxon oaksoil</i>	Stream			
<i>P. species1</i>	<i>Rhododendron</i>	Stream		
<i>P. species2</i>	Stream			

\* EU regulated species



# *Phytophthora ramorum* in Ireland

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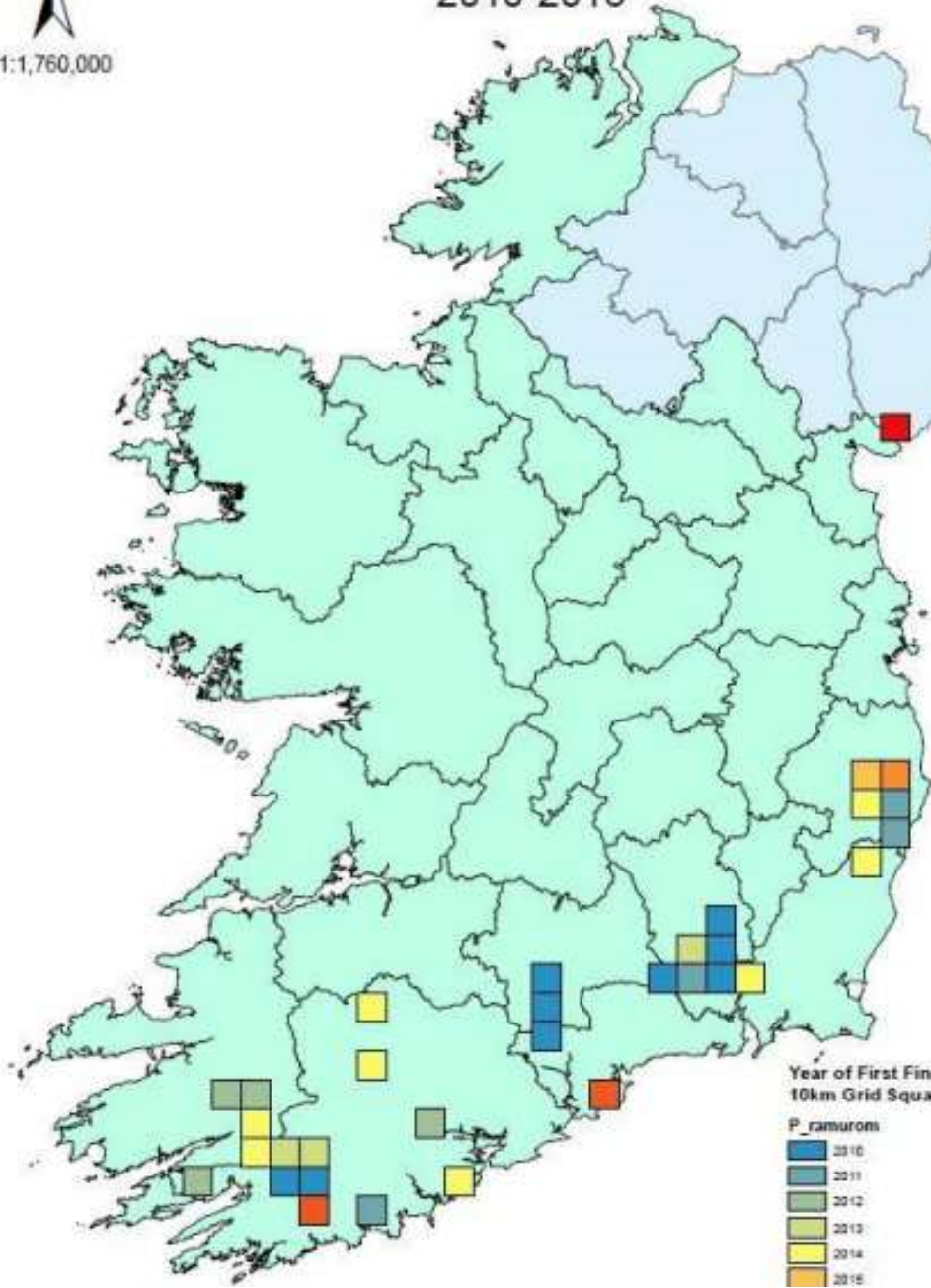
*P. ramorum* (KT633936)

EU regulated organism -  
emergency measures

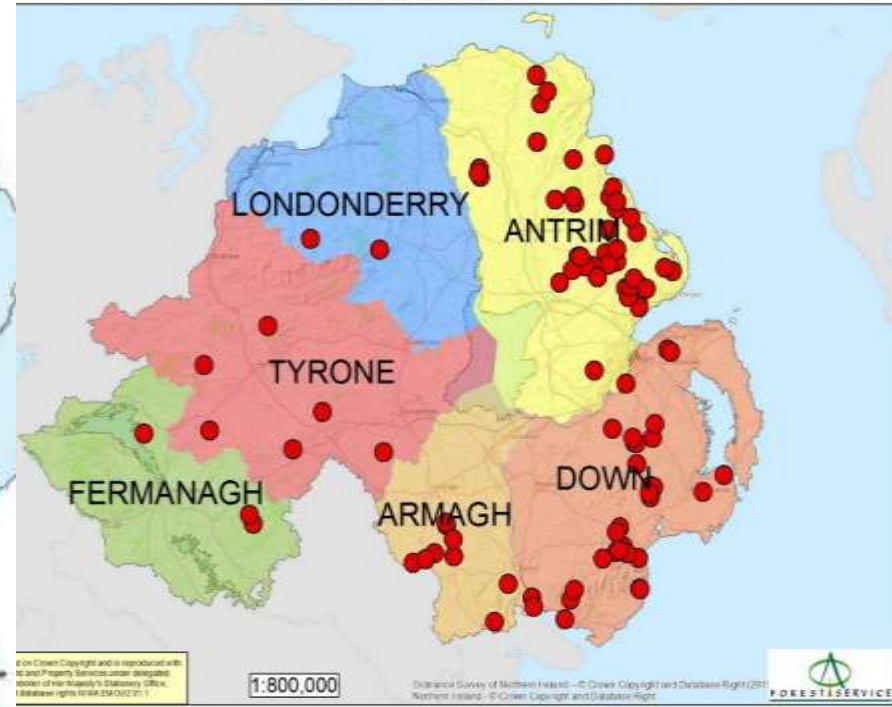
*Arbutus* sp. (2015); *Azalea* sp. (2012, 2014, 2015);  
*Cameilla japonica*, sp. (2007, 2008, 2009, 2010,  
2011, 2012, 2013, 2014, 2015); *Choisya* sp. (2011);  
*Cryptomeria* sp. (2015); *Griselinia littoralis*, sp.  
(2010); *Kalmia latifolia*, sp. (2010); *Leucothoe  
fontanesiana*, sp. (2008, 2009, 2012, 2014);  
*Magnolia* sp. (2007, 2009, 2010, 2013); *Michelia  
doltsopa*, sp. (2010); *Nerium oleander*, sp. (2014);  
*Osmanthus* sp. (2014); *Photinia fraseri*, sp. (2007,  
2008, 2009, 2014); *Pieris japonica*, sp. (2010, 2011,  
2012, 2014); *Prunus lusitanica*, sp. (2013, 2014,  
2015); *Rhododendron arboretum*, spp. (2003, 2004,  
2005, 2007, 2008, 2009, 2010, 2011, 2012, 2013,  
2014, 2015); *Sarococca* sp. (2014); *Vaccinium* sp.  
(2011, 2014); *Viburnum davidii*, *hillieri*, sp., *tinus*  
(2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010,  
2011, 2012, 2013, 2014, 2015)

# Phytophthora ramorum 2010-2018

N  
1:1,760,000



# Phytophthora ramorum 2016



# Above-ground symptoms

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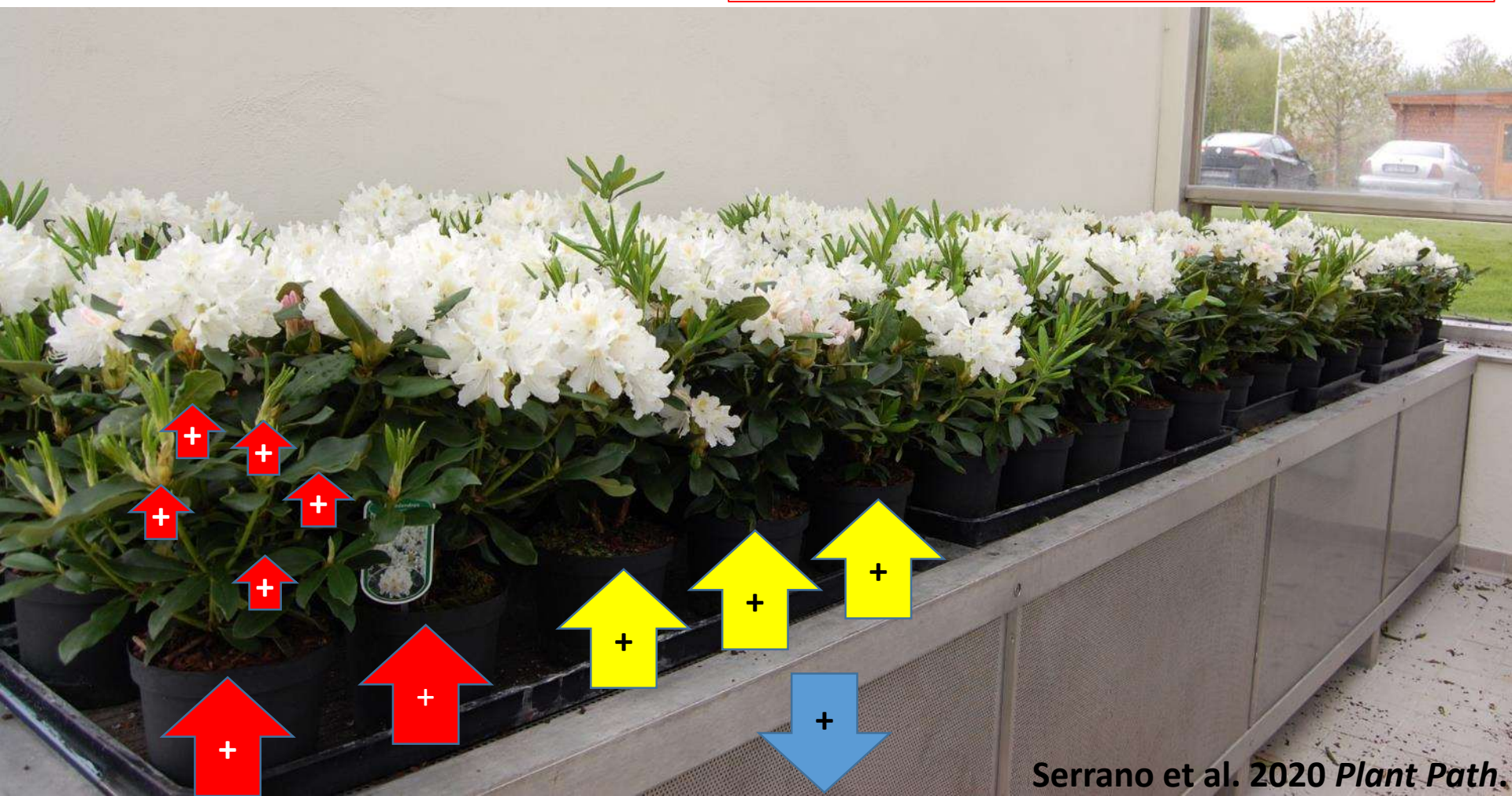
# Eradicating a *Phytophthora* mini-outbreak

Spread within plants - <6 weeks  
6 months – spread 3 plants

**Official actions**

**2mt = destruction**

**10mt = hold >3 months and test**

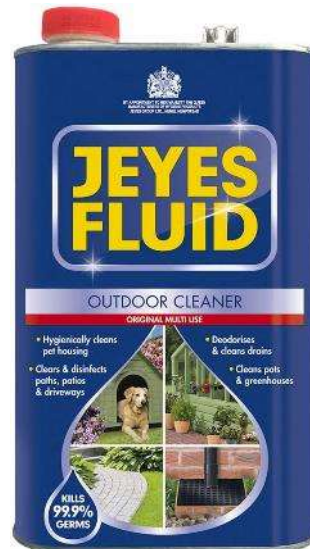


# Efficacy of biocide disinfectants

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## Efficacy of biocides against *P. ramorum* in *Rhododendron* leaf pieces

- Jeyes fluid (@ 5%)
- Bleach (Sodium hypochlorite @ 5%)
- Envirocair (Quaternary ammonium compound)



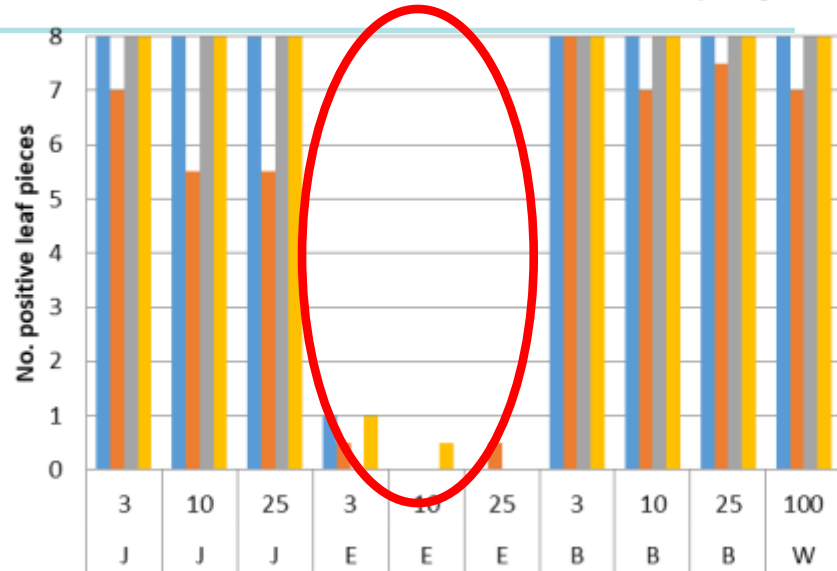




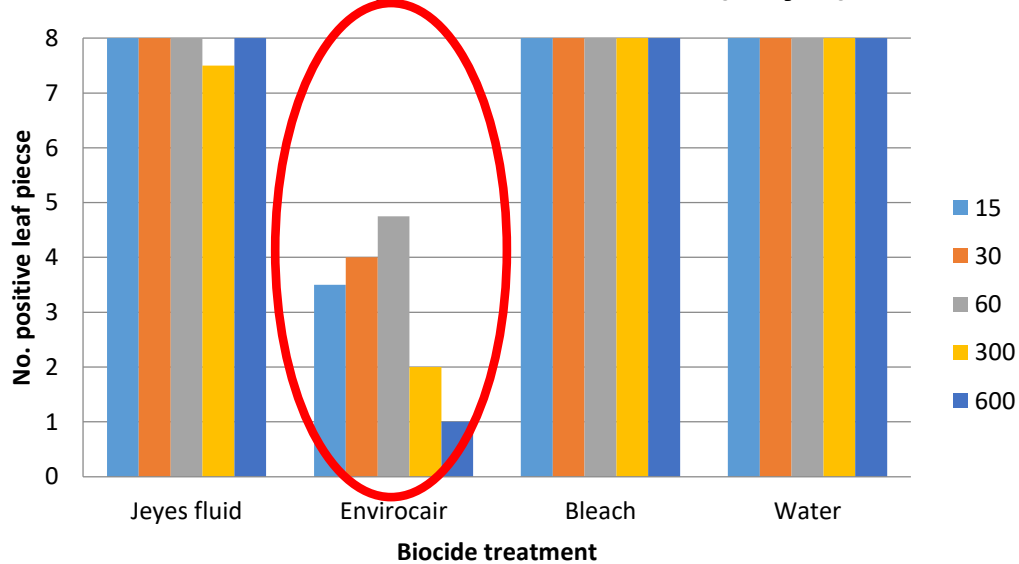
# Results



**Biocide/concentration trial (day 21)**



**Biocide/exposure time trial (day 7)**



Physically remove debris

# Management and eradication

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- Buy from a reliable source
- Quarantine
- Don't have excess water
- Regular checking/monitoring
- Good hygiene
- Work with NPPO
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