



Monitoring for threatening plant pathogens in Northern Ireland

Dr Richard O Hanlon
Grassland and Plant Science Branch
EPPO workshop
13/12/17

The Sudden larch death epidemic

- Pre-2010, *P. ramorum* infection in forests associated with infected Rhododendron
- Since 2010, Disease epidemic in Japanese larch not always associated with Rhododendron
- Epidemic in Japanese larch spread rapidly and over long distances
- Policy enforced removal of Japanese larch in Ireland (>300ha), Northern Ireland (>1000ha) and Britain (>17,000ha)

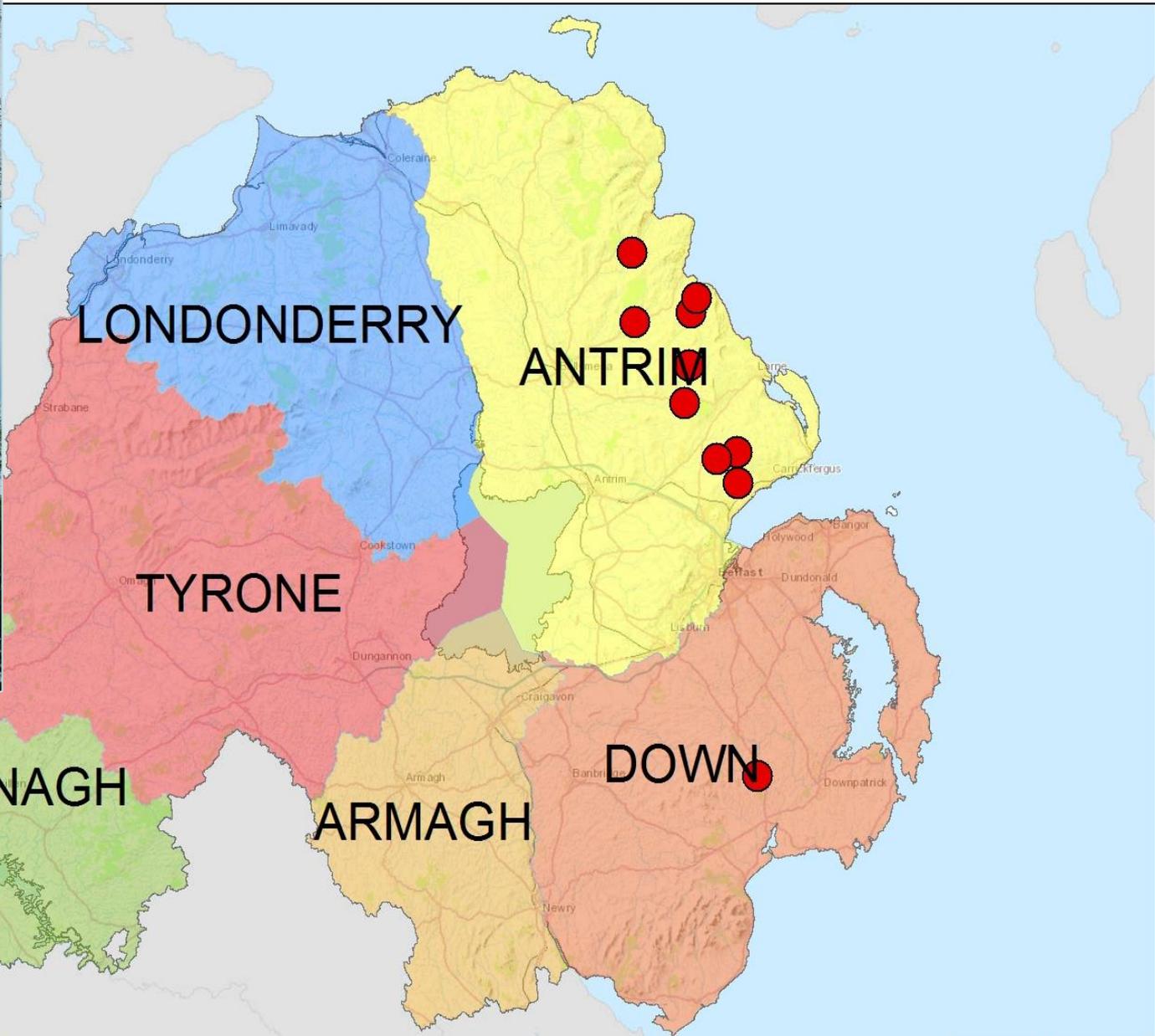




P. ramorum infected
Japanese larch in
Kilkenny ca.
2010/2011

afbi Food and
Biosciences Institute
Photo credit:
Gerard Cahalane
Forest Service

Phytophthora ramorum 2010



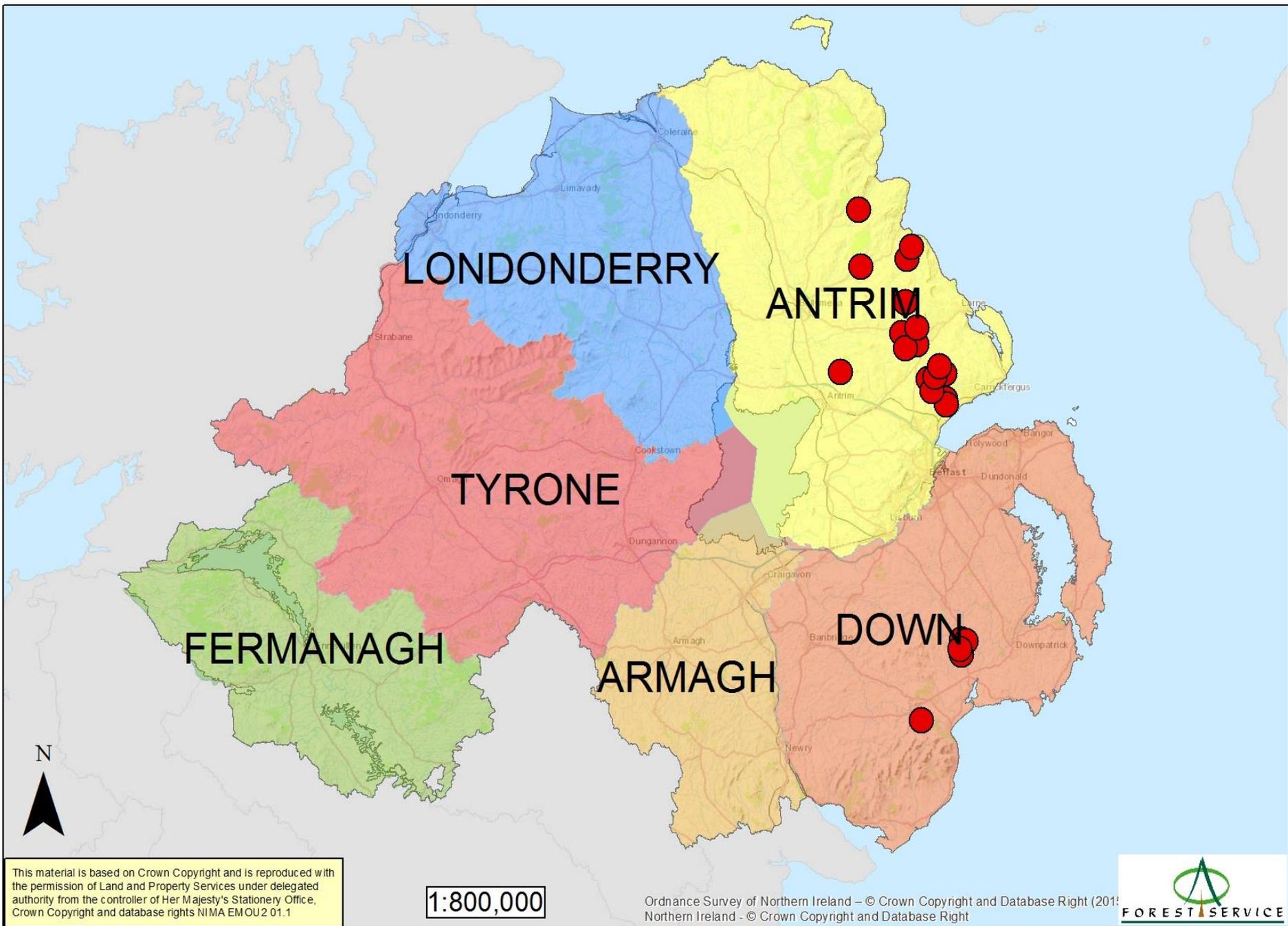
This material is based on Crown Copyright and is reproduced with the permission of Land and Property Services under delegated authority from the controller of Her Majesty's Stationery Office. Crown Copyright and database rights NIMA EM OU2 01.1

1:800,000

Ordnance Survey of Northern Ireland – © Crown Copyright and Database Right (2010)
Northern Ireland - © Crown Copyright and Database Right



Phytophthora ramorum 2011



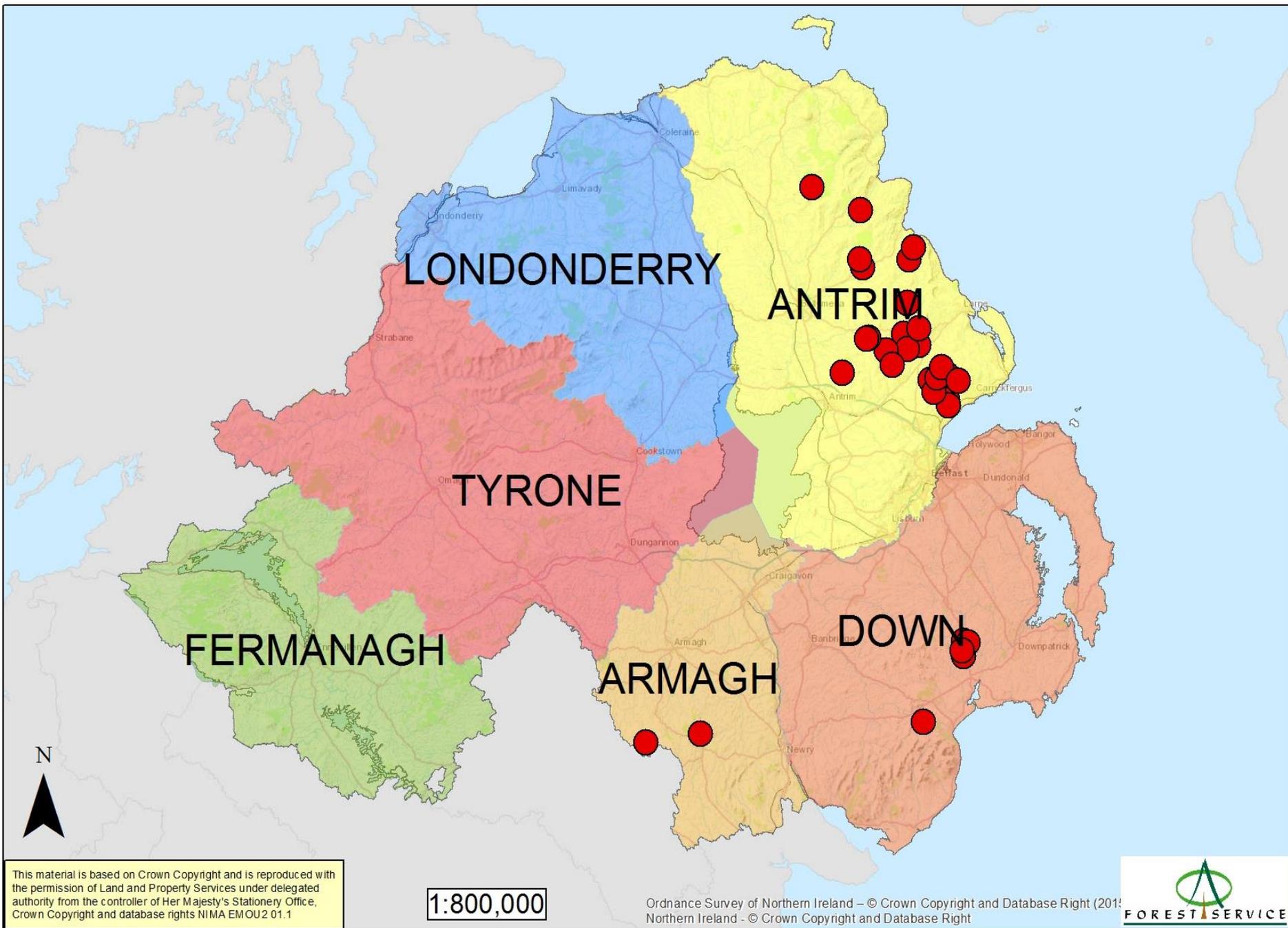
This material is based on Crown Copyright and is reproduced with the permission of Land and Property Services under delegated authority from the controller of Her Majesty's Stationery Office, Crown Copyright and database rights NIMA EM OU 2 01.1

1:800,000

Ordnance Survey of Northern Ireland – © Crown Copyright and Database Right (2011)
Northern Ireland - © Crown Copyright and Database Right



Phytophthora ramorum 2012



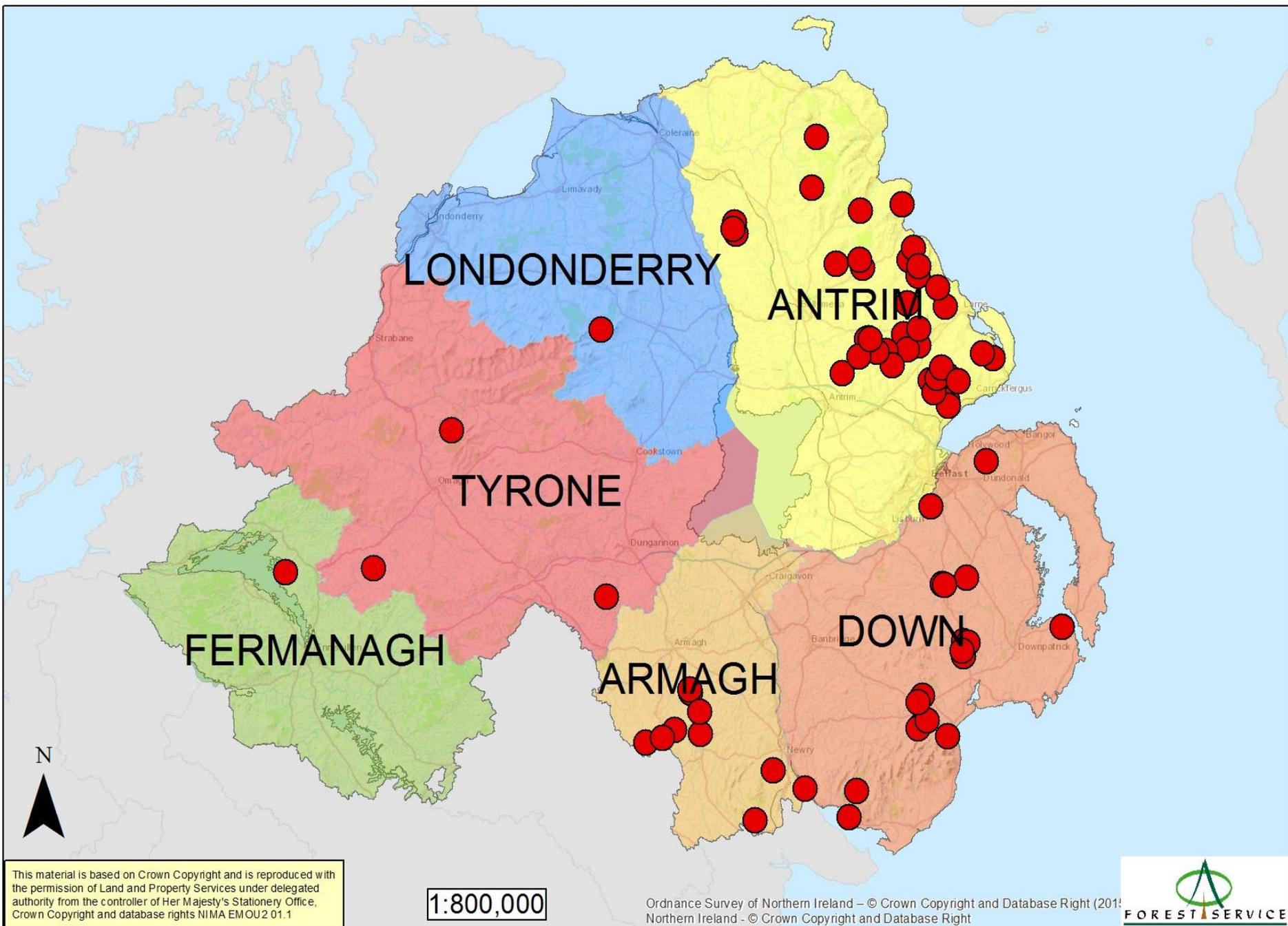
This material is based on Crown Copyright and is reproduced with the permission of Land and Property Services under delegated authority from the controller of Her Majesty's Stationery Office, Crown Copyright and database rights NIMA EM OU 2 01.1

1:800,000

Ordnance Survey of Northern Ireland – © Crown Copyright and Database Right (2011)
Northern Ireland - © Crown Copyright and Database Right



Phytophthora ramorum 2013



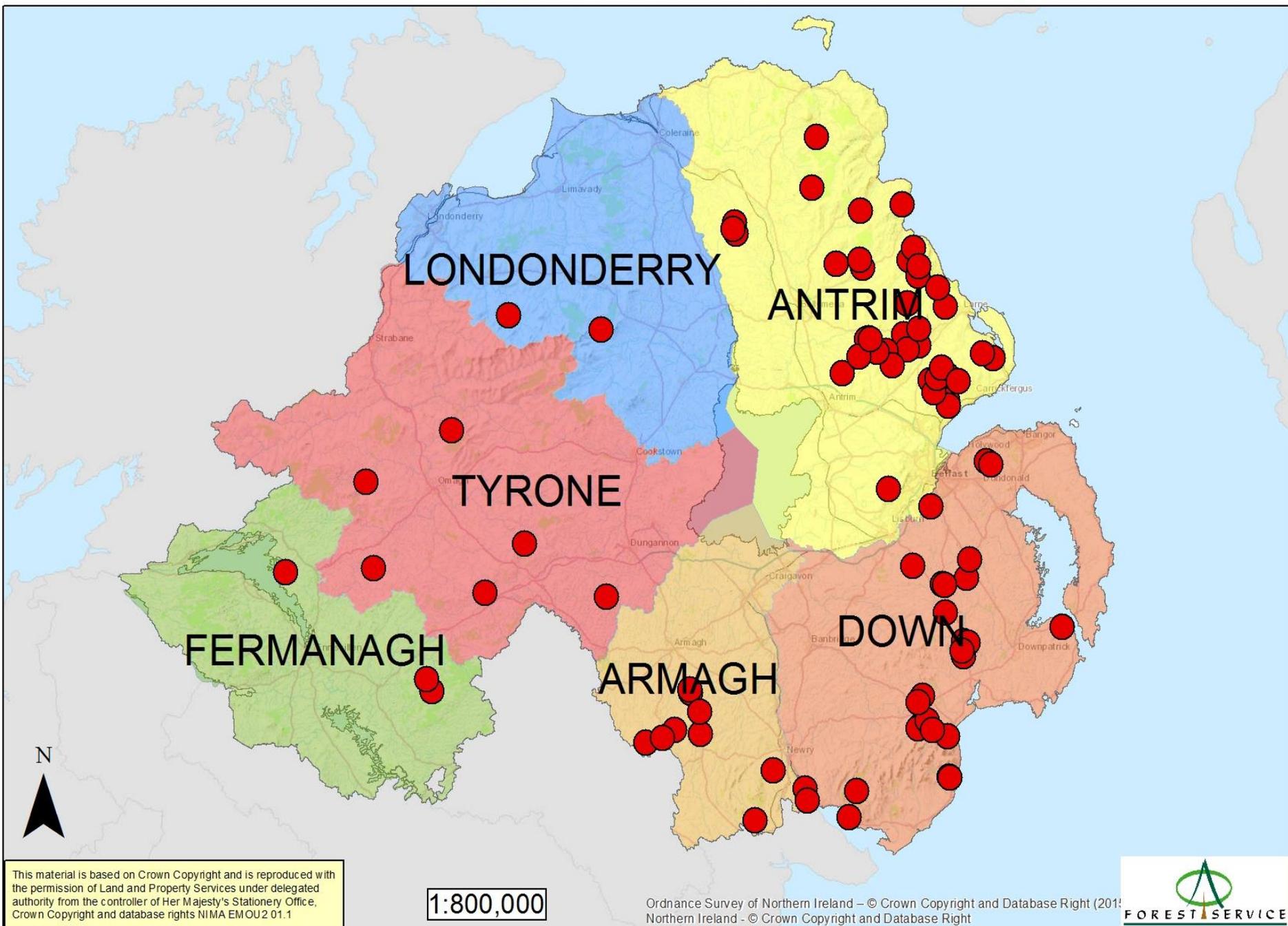
This material is based on Crown Copyright and is reproduced with the permission of Land and Property Services under delegated authority from the controller of Her Majesty's Stationery Office. Crown Copyright and database rights NIMA EM OU2 01.1

1:800,000

Ordnance Survey of Northern Ireland – © Crown Copyright and Database Right (2014)
Northern Ireland - © Crown Copyright and Database Right



Phytophthora ramorum 2014



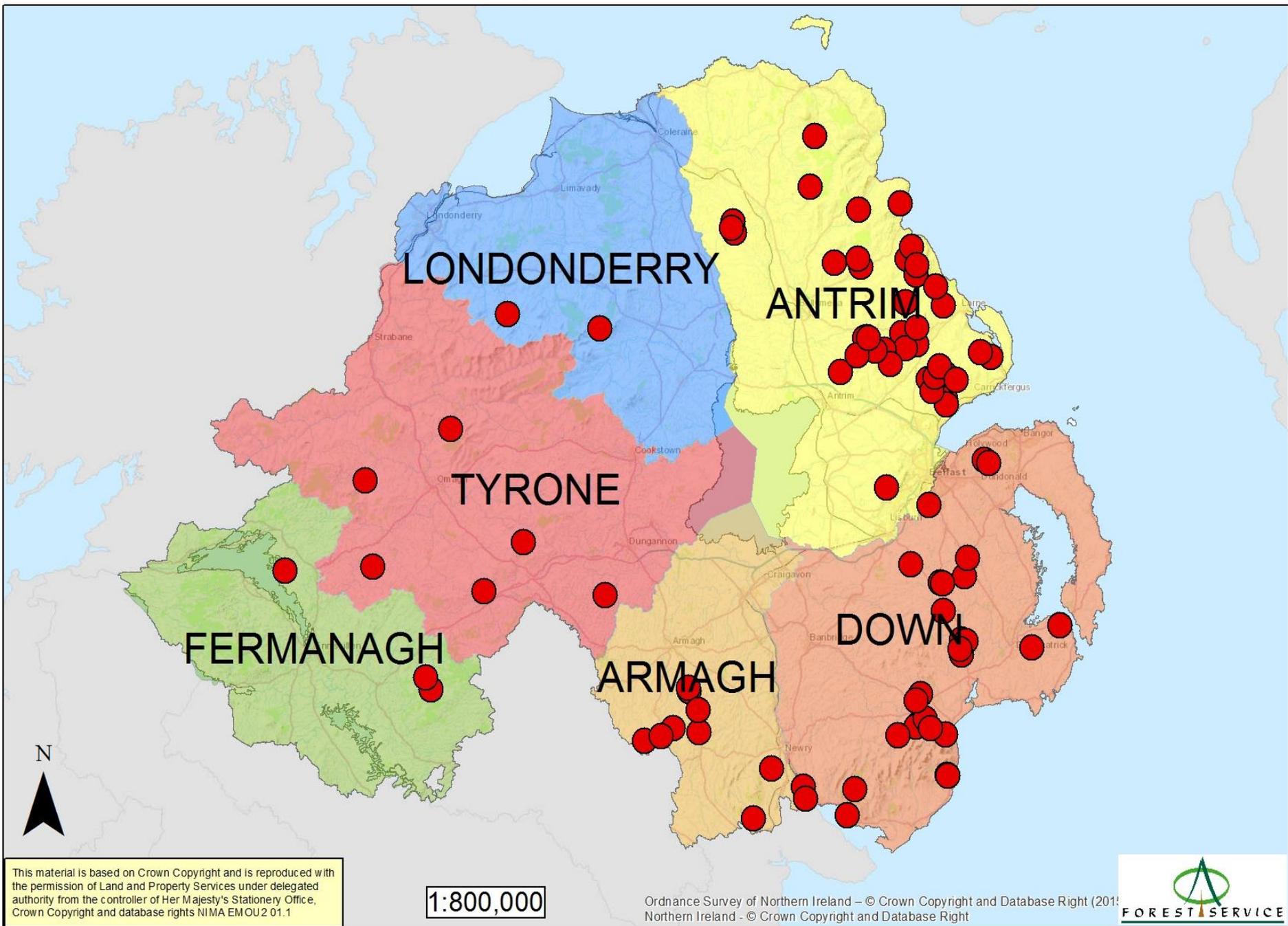
This material is based on Crown Copyright and is reproduced with the permission of Land and Property Services under delegated authority from the controller of Her Majesty's Stationery Office, Crown Copyright and database rights NIMA EM OU2 01.1

1:800,000

Ordnance Survey of Northern Ireland – © Crown Copyright and Database Right (2014) Northern Ireland - © Crown Copyright and Database Right



Phytophthora ramorum 2015



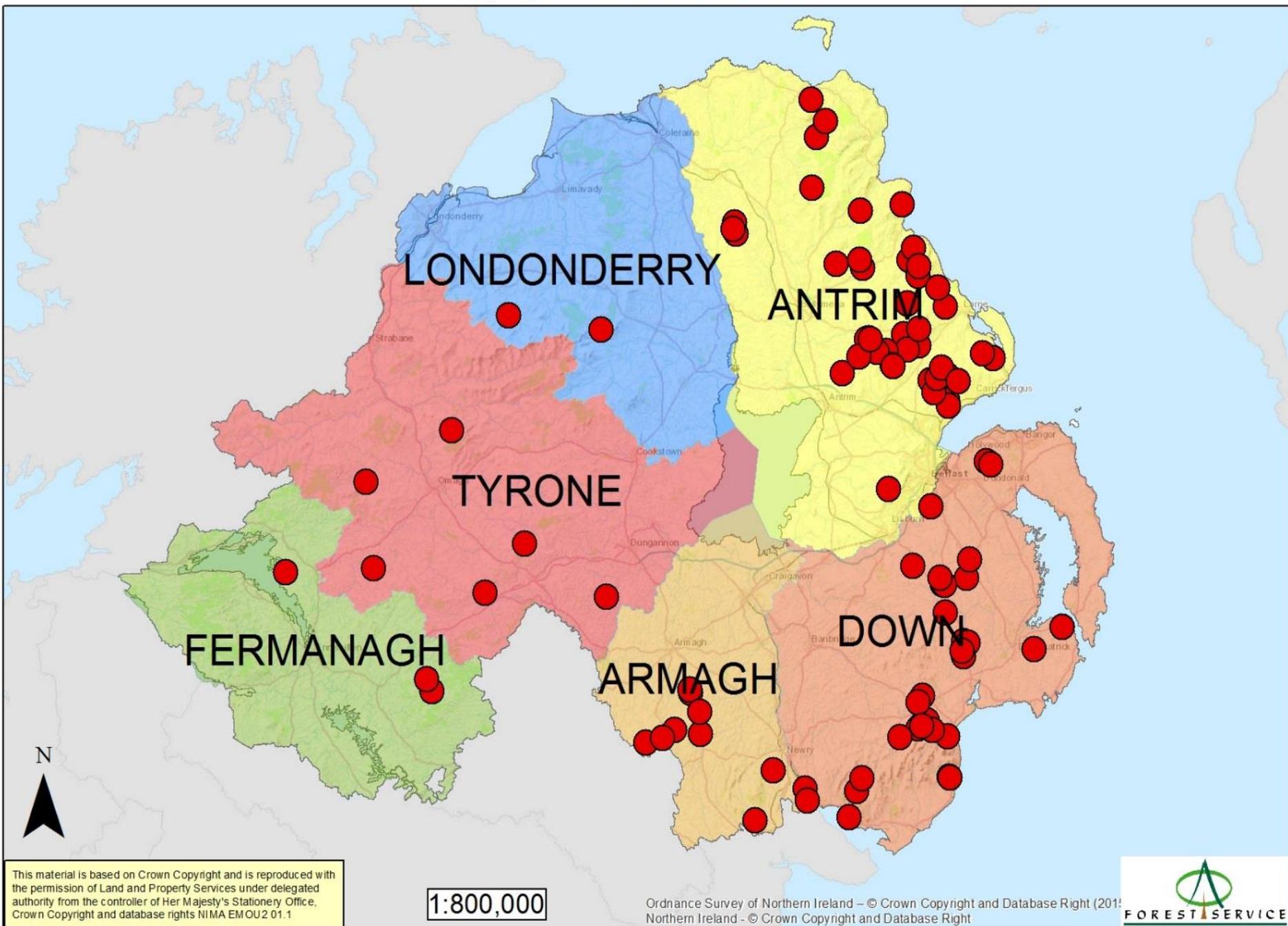
This material is based on Crown Copyright and is reproduced with the permission of Land and Property Services under delegated authority from the controller of Her Majesty's Stationery Office. Crown Copyright and database rights NIMA EM OU2 01.1

1:800,000

Ordnance Survey of Northern Ireland – © Crown Copyright and Database Right (2015)
Northern Ireland - © Crown Copyright and Database Right



Phytophthora ramorum 2016



This material is based on Crown Copyright and is reproduced with the permission of Land and Property Services under delegated authority from the controller of Her Majesty's Stationery Office, Crown Copyright and database rights NIMA EM OU2 01.1

1:800,000

Ordnance Survey of Northern Ireland – © Crown Copyright and Database Right (2011)
Northern Ireland - © Crown Copyright and Database Right

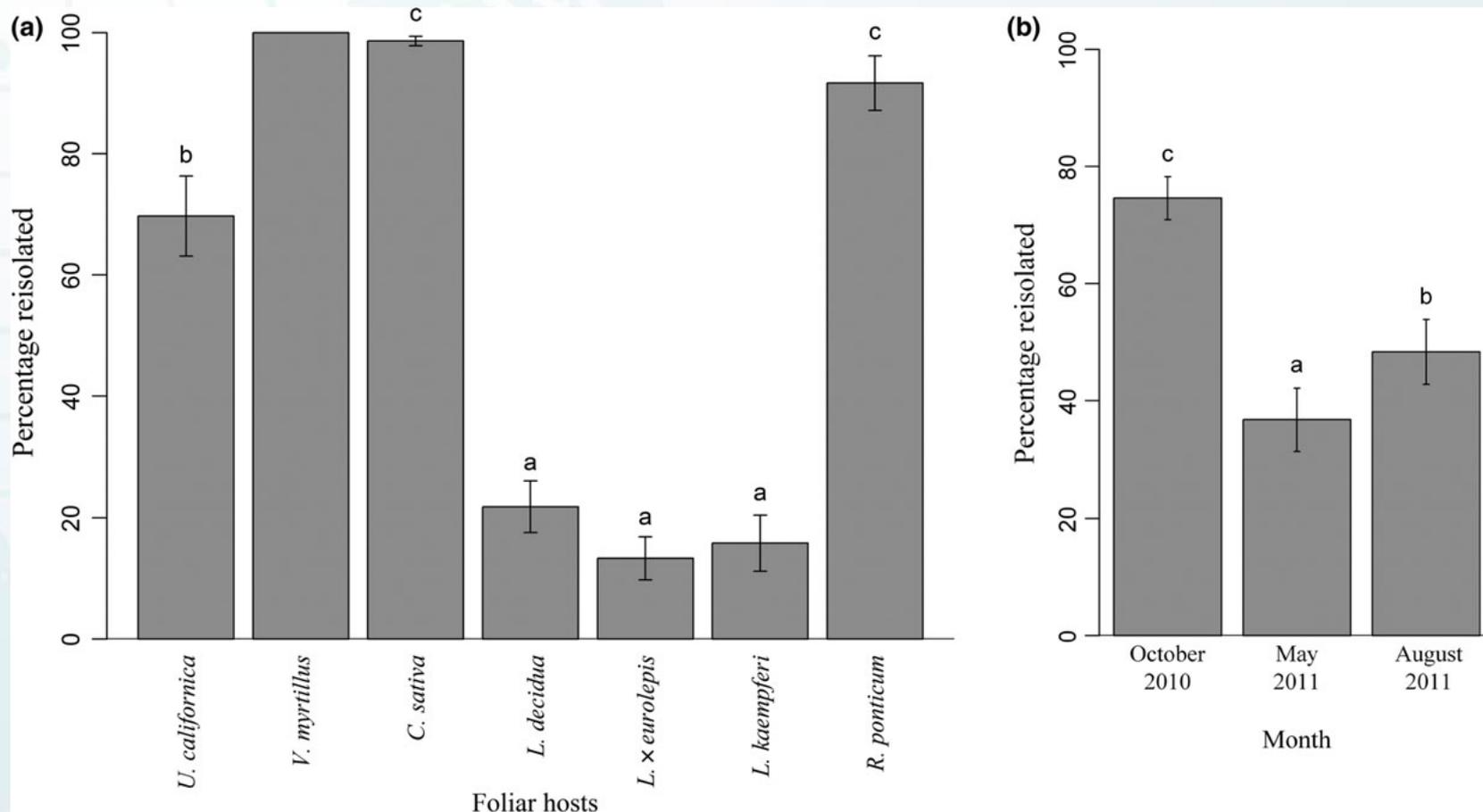




Long distance
aerial
spread?

Cryptic infection

- <20% of infected needles developed symptoms
- < 20% reisolation rate

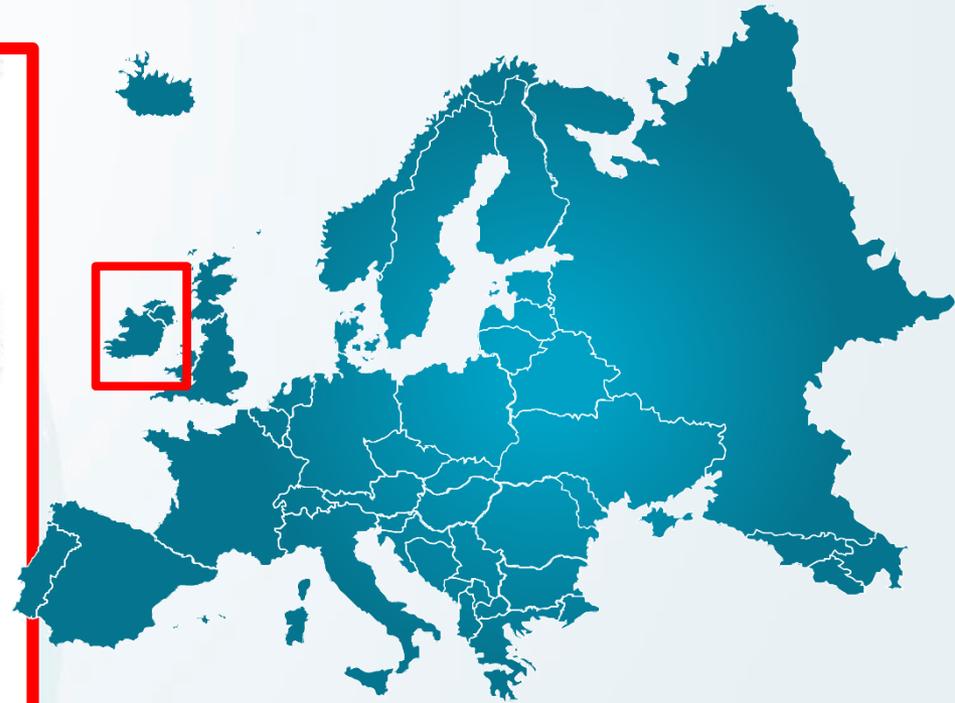
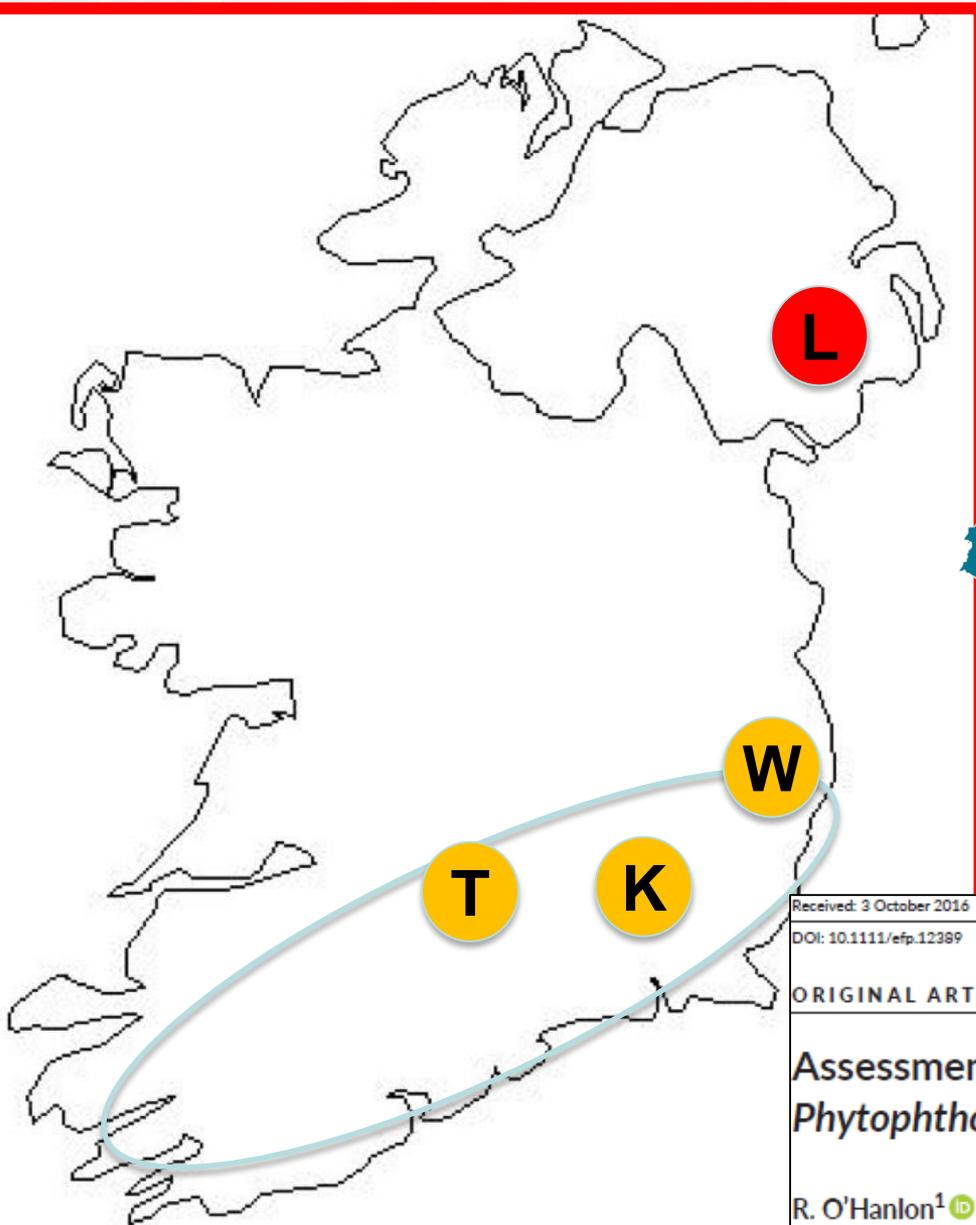


P. ramorum samples tested AFBI

| Year | Samples | No. Positive |
|------|---------|--------------|
| 2006 | 55 | 2 |
| 2007 | 317 | 62 |
| 2008 | 178 | 24 |
| 2009 | 73 | 3 |
| 2010 | 38 | 5 |
| 2011 | 77 | 11 |
| 2012 | 263 | 50 |
| 2013 | 248 | 156 |
| 2014 | 142 | 40 |
| 2015 | 95 | 22 |
| 2016 | 28 | 9 |
| 2017 | 5 | 1 |
| All | 1519 | 385 |

| Species | Source |
|-------------------------|-----------------|
| <i>P. plurivora</i> | Beech (2014) |
| <i>P. gonapodyides</i> | Water (2017) |
| <i>P. chlamydospora</i> | Water (2017) |
| <i>P. lacustris</i> | Water (2017) |

The sites



630 hectare mixed tree species public forest

Received: 3 October 2016

Accepted: 29 August 2017

DOI: 10.1111/efp.12389

ORIGINAL ARTICLE

WILEY Forest Pathology

Assessment of the eradication measures applied to *Phytophthora ramorum* in Irish *Larix kaempferi* forests

R. O'Hanlon¹ | J. Choiseul² | J. M. Brennan² | H. Grogan³

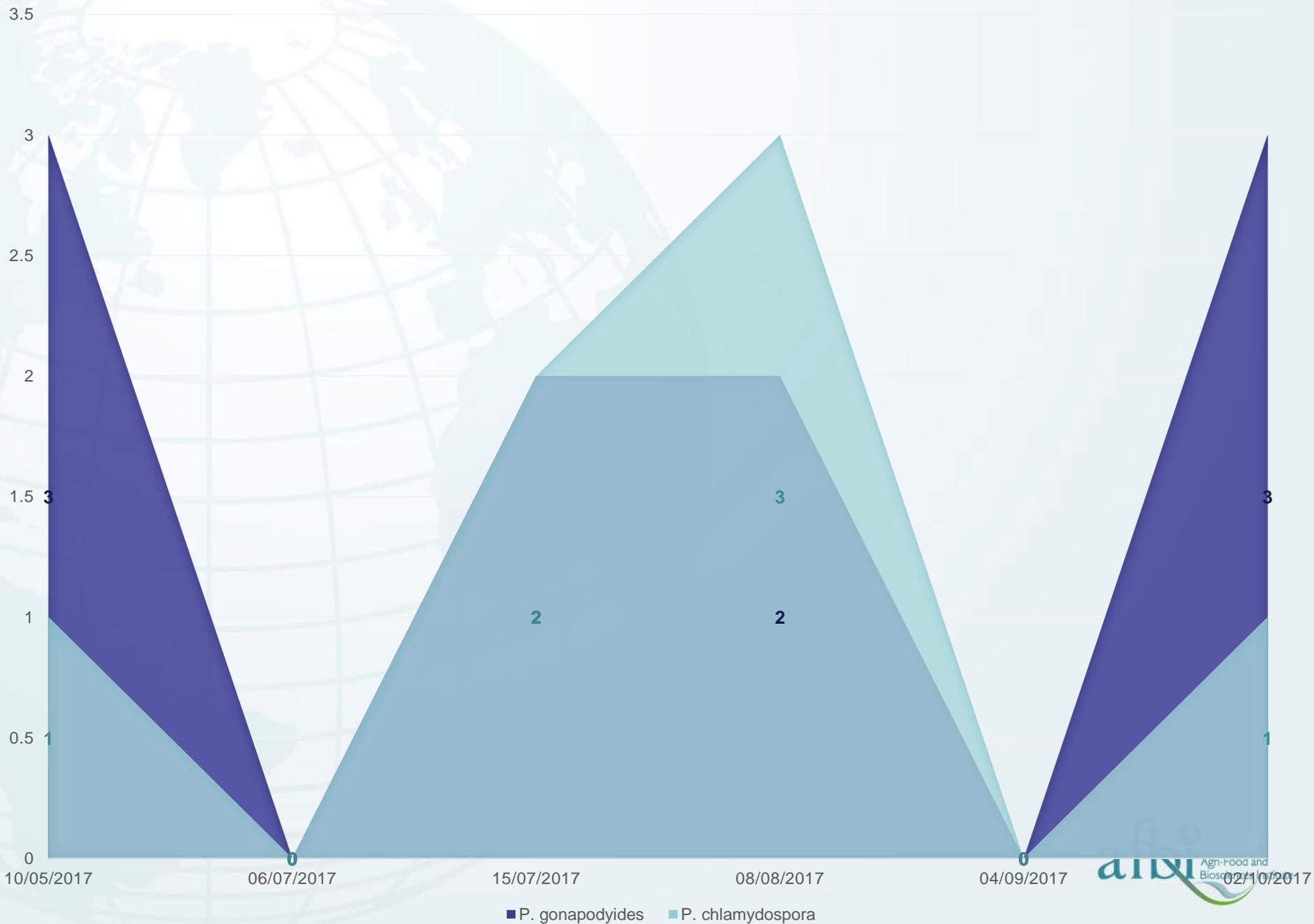


Sites visited monthly since 05/17

- 13 rain traps sampled
- 8 streams baited
- Symptomatic and asymptomatic plant samples taken
- Samples plated onto selective media (PARP)
- Isolates morphologically examined and ITS sequenced

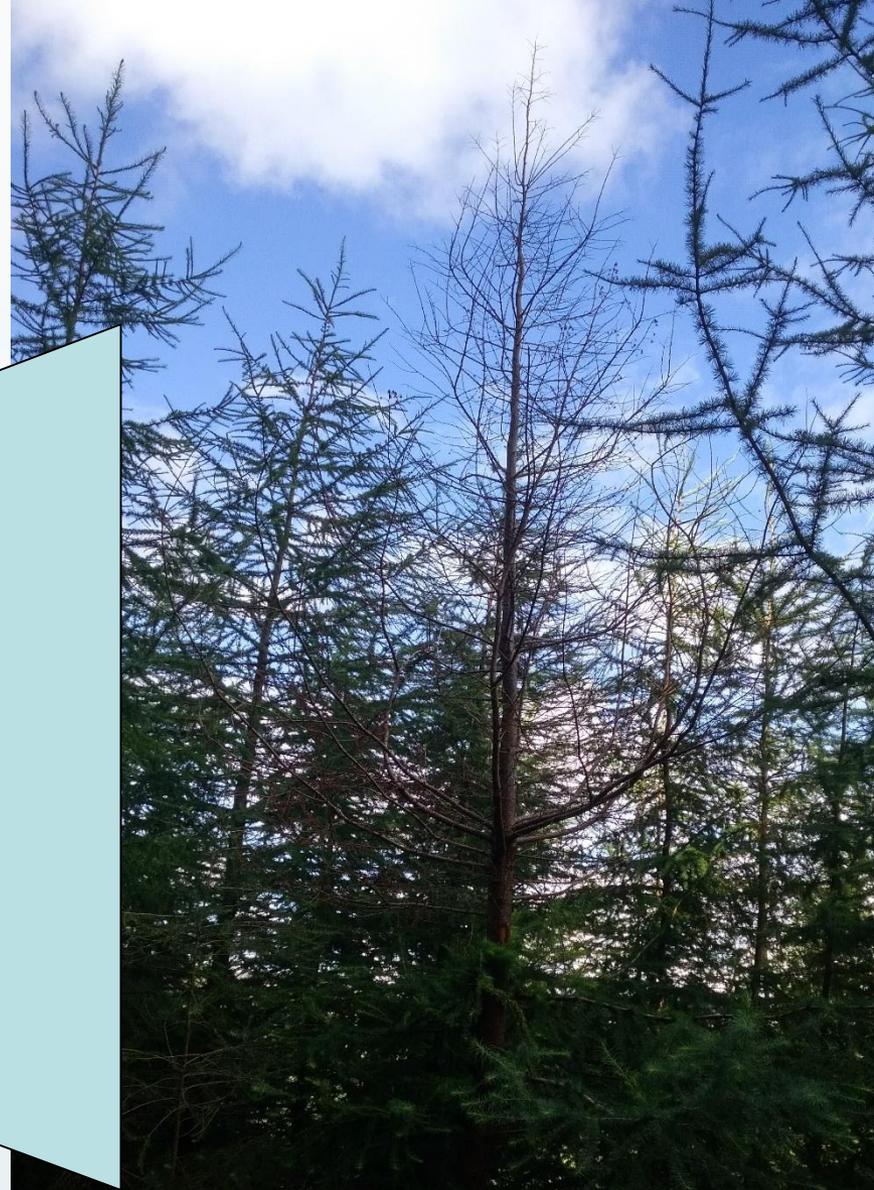
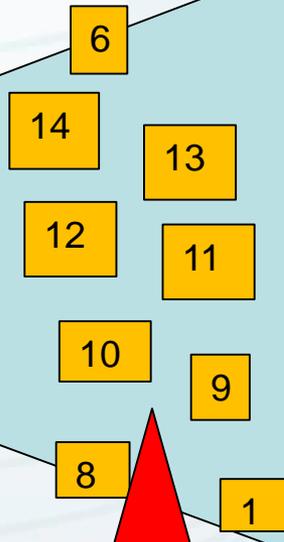
| Samples | Samples (<i>Phytophthora</i> positive %) | Taxa |
|----------------|---|---|
| Plant material | 23 (17) | 4 (<i>P. cambivora</i> , <i>P. chlamydospora</i> , <i>P. gonapodyides</i> , <i>P. ramorum</i> , <i>P. sp</i>) |
| Low traps | 44 (27) | 3 (<i>P. cambivora</i> , <i>P. chlamydospora</i> , <i>P. ramorum</i> , <i>P. spp.</i>) |
| High traps | 40 (23) | 3 (<i>Phytopythium litorale</i> , <i>P. sp.</i> , <i>Pythium sp.</i>) |
| Water baits | 49 (76) | 9 (<i>P. chlamydospora</i> , <i>P. gonapodyides</i> , <i>P. ramorum</i> , <i>P. taxon oaksoil</i> , <i>P. lacustris</i> , <i>P. spp.</i> , <i>Phytopythium litorale</i> , <i>Pythium sp.</i> , <i>Nothophytophthora sp.</i>) |

WATER BAIT PHYTOPHTHORA COMMUNITY



P. ramorum

- 1 stream near infected ornamental *Rhododendron*
- 1 rainwater trap near infected *L. kaempferi*



Advantages

- Identify real-time spread of pathogen
- Cheap materials to manufacture
- Visible effort to stakeholders
- Stream baiting useful to focus surveys



Disadvantages

- Not direct evidence of infection
- Time consuming
- Selective baiting host?

Contact details

- Richard.ohanlon@afbini.gov.uk