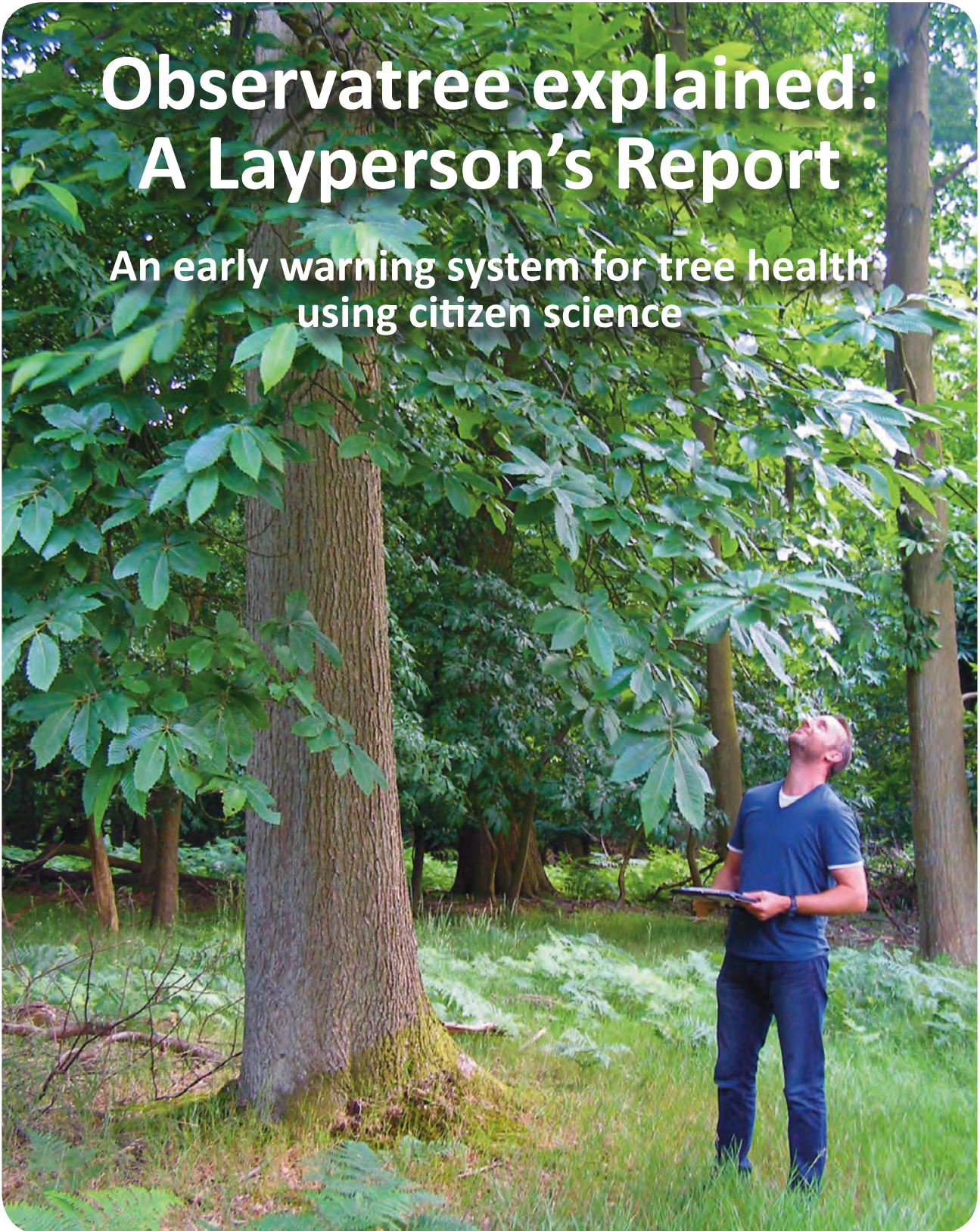


Observatree explained: A Layperson's Report

An early warning system for tree health
using citizen science



Funded by the EU's LIFE programme





LIFE Observatree – an integrated early warning system for tree pests and diseases using citizen science

This report provides a non-technical summary of the LIFE Observatree project and outlines how we have successfully trained volunteers to identify and report tree pests and diseases to form part of a tree health early warning system. Further information can be obtained from the project website or by contacting us.

Beneficiary name:

Forestry Commission Research Agency (Forest Research)

Names of contributors:

Forest Research, Fera Science Ltd, Forestry Commission, The National Trust, Woodland Trust.

The project is also supported by the Department of Environment, Food and Rural Affairs (Defra), the Animal Plant Health Agency (APHA) and Natural Resources Wales (NRW).

Project duration:

01/10/2013 – 30/09/2017

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€2,193,909 (€1,096,693)



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Visit our project website at
observatree.org.uk

or contact us via

observatree.org.uk/contact-us/



Introduction

Observatree is a project aimed at helping to protect the UK's trees.

Where trees have evolved alongside a pest or disease, a natural balance has often resulted whereby the tree has developed some level of defence against affecting organisms. However, with increased global movement of trade and people, pests and diseases from around the world have the potential to arrive on our shores faster than by natural movement.

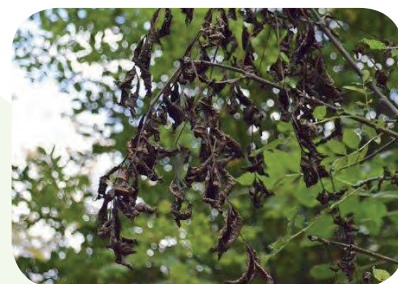
Whilst procedures are in place to reduce risks, an infected plant may be brought into the country from other parts of the world. But there are many less obvious mechanisms too. Wooden objects such as clocks and knife blocks have contained the grubs of beetles that have hatched out and have the potential to infest our native trees. Wood packaging and pallets are used to transport goods all over the world and wood is imported for many uses. These materials should be treated at their point of origin to prevent the spread of pests, but there remains a risk that some will slip through the net.

Our changing climate is also helping the introduction of alien pests and diseases. Those that would once have been killed by our cold winters are now more often able to survive from one year to the next.

When these pests or diseases arrive our trees are often unable to combat them as they have not had time to evolve defence mechanisms. Many pests and diseases can slow the growth of our trees making them unsightly or unproductive. Others have potential to kill the tree completely. Whilst the loss of any tree species would be tragic, several different species are currently under threat from these new pests or diseases. The possible changes to our much-loved amenity and wooded landscapes could be permanent and dramatic.

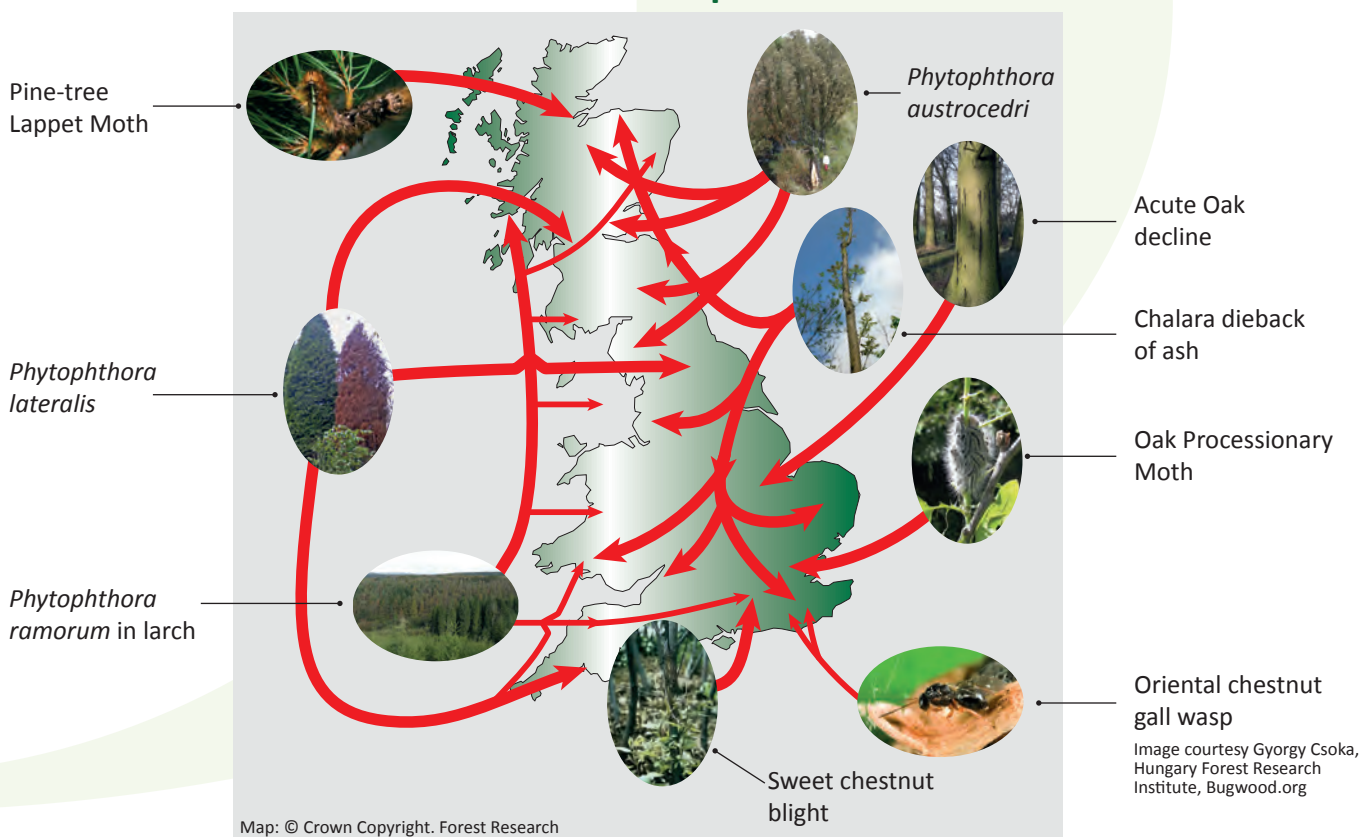


Sirococcus tsugae



Chalara dieback of ash

Current outbreaks September 2016



Project aims



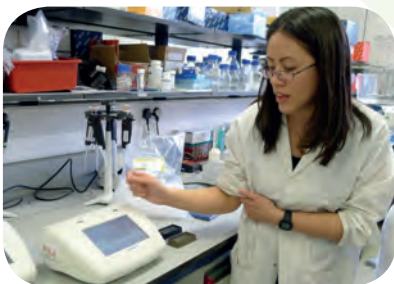
Working with tree health scientists



Working with tree health inspectors



On-site training from professionals



Using cutting edge technology

There are various mechanisms in place to help prevent tree pests and diseases entering the UK. Tree health inspectors and scientists are working hard to protect our trees. But there is always a risk that something new will enter unnoticed. When a new pest or disease does arrive the best way to limit any impact is through early detection before it can spread too far. This allows controls to be quickly implemented.

The Observatree project has a network of over 230 volunteers from across the UK who can look out for, and report findings of, pests and diseases.

This complements the work of our plant and tree health professionals in order to help reduce the risk of a new pest or disease becoming established. Our aim is to provide our volunteers and others with the information and resources they need to help implement this important early warning system for tree health across the UK.

A strong partnership is essential

The project brings together the best skills, knowledge and experience from across the UK to collaborate and share in this single aim. Our national forest, woodland and land managers, forest researchers, tree and plant health scientists, inspectors and policy makers and charitable organisations concerned with the protection of our landscape and heritage all work together with the combined interest of helping to protect UK trees.

EU LIFE funding has helped facilitate this collaboration to produce a more cohesive approach to tree health within the UK. This has given the additional benefit of:

- improving communications around tree health between these various organisations
- allowing greater awareness of pests and diseases
- increased data and knowledge exchange allowing improved risk management.



More trained eyes on the ground to spot pests and diseases earlier

Methods

Setting realistic priorities

There are many potential pests and diseases that pose a threat to UK trees – far too many for the project to properly focus on. Instead, we have established a shorter list of 21 priority pests and diseases. This list is reviewed annually by plant health experts and amended if necessary. We have selected our priority species to represent some of the pests and diseases that are of greatest concern to UK trees should they become established. Some of these are not currently thought to be present within the UK and we hope that early detection of an outbreak will allow proactive management and mitigation. However, some of our selected species are known to be present in the UK, but their full extent unknown. In establishing the list of 21 pests and diseases, it was important that we selected those that volunteers can identify on the host tree without the need for specialist equipment.

Eyes on the ground

Core to the success of this project was the establishment of a network of volunteers. We have trained over 230 volunteers to identify and report on tree pests and diseases. Each potential volunteer was expected to:

- complete a detailed application form
- undergo a telephone interview
- complete an online questionnaire

This captured their existing knowledge about tree health concerns and experience in biological surveying. We also ensured a wide geographic spread of people across the UK.

Volunteers have two major roles. **The majority check trees in their local woodlands, parks and streets to report upon their health.** We felt that it was important to provide volunteers with something they could begin to report on, whilst also providing important data. Having a priority list of pests and diseases that included some already in the UK helped facilitate this.

A second volunteer role is to verify pest and disease reports submitted by others. Tree Alert is the official online tool for reporting tree pests and diseases within Britain. Reports submitted via Tree Alert are received by tree health scientists within Forest Research where they are diagnosed. Further follow-up investigation is undertaken if necessary.

To help scientists make the most accurate diagnosis possible it is important to have as much detailed information within the report as possible.

If incomplete reports are received via Tree Alert, scientists have to spend time contacting the individual who submitted the report, seeking additional information. Instead, this task is carried out by verification volunteers, allowing scientists to focus more on the diagnostic process.



Ongoing support for volunteers



Asian Longhorn Beetle
Photo: Forestry Commission



Emerald Ash Borer



Dothistroma Needle Blight



Horse Chestnut Leaf Miner

21 Priority pests and diseases

1. Acute Oak Decline
2. Asian Longhorn Beetle
3. Bronze Birch Borer
4. Chalara Dieback of Ash
5. Citrus Longhorn Beetle
6. Dothistroma Needle Blight
7. Emerald Ash Borer
8. Great Spruce Bark Beetle
9. Horse Chestnut Leaf Miner
10. Mountain Ash Ring Spot
11. Oak Lace Bug
12. Oak Processionary Moth
13. Oriental Chestnut Gall Wasp
14. *Phytophthora austrocedri*
15. *Phytophthora lateralis*
16. Pine Processionary Moth
17. Plane Lace Bug
18. Plane Wilt
19. Red-necked Longhorn Beetle
20. *Sirococcus tsugae*
21. Sweet Chestnut Blight

Providing the necessary skills



Practising conifer identification



Observing tree disease in the field



Learning how to take bark samples



Face to face training from experts

Training is essential to the success of Observatree. To help our volunteers carry out surveys with confidence, and to ensure quality reports are submitted, they need to be able to correctly identify not only our priority pests or diseases but the host species of tree on which they are usually found.

We have invested heavily in training our volunteers, providing face-to-face training sessions at 12 different locations each year throughout the UK.

These sessions use a variety of training methods including:

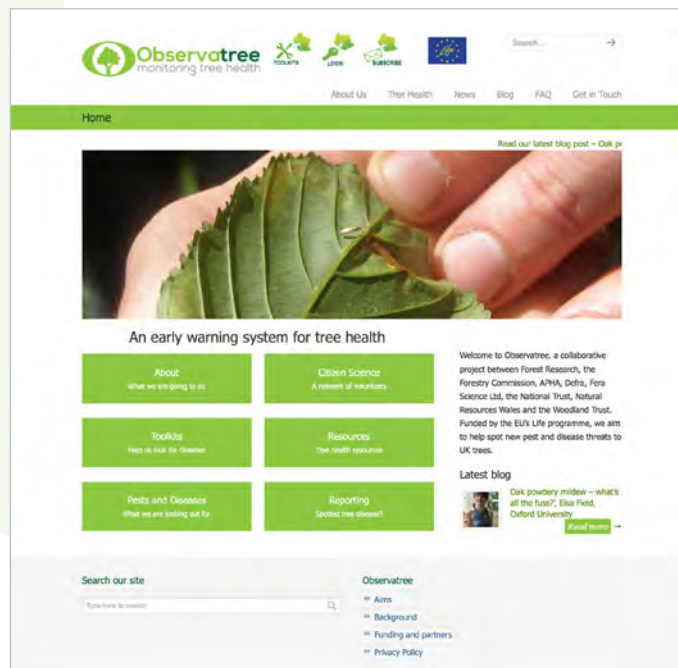
- oral presentations by project staff
- practical sessions such as tree identification (held within a classroom-like environment)
- opportunities to practise their skills in surrounding woodlands accompanied by professionals

In addition, webinars have been held describing our pests or diseases.

This has allowed volunteers to join in with online presentations, hosted by an expert. By participating with these live events volunteers have been able to pose questions to the expert at the end. Webinars are recorded and placed onto the project website to allow anyone to watch the presentation in their own time.

Digital learning in the form of a series of online videos provides further opportunities and we have created resources and videos aimed at helping volunteers (and others) to record the necessary information required to submit a tree health report.

Training has also included ‘mentoring events’, where volunteers not only provide support for each other, but also propose topics they would like to have covered during these events.



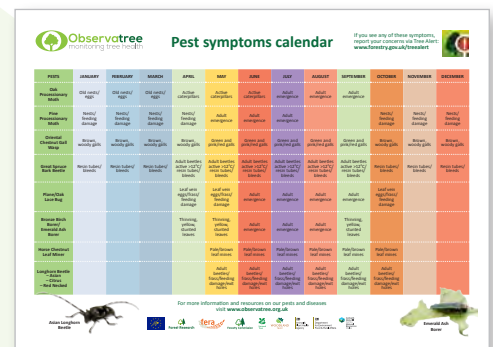
Many educational resources are available on our website

Creating new tools

We have produced a range of educational and training resources.

These include:

- Identification guides for all of our priority pests and diseases. These highly illustrative, easy to use guides are up-to-date and include look-alike symptoms. Waterproof, hard copies are printed for use by volunteers during their surveys. They are also available to download for free on our website. These guides offer such up-to-date quality of information that they are also used by professional plant health inspectors both within the UK and internationally. Volunteers are motivated as they feel that their part of the project is important enough to justify time spent in producing such high quality guides used by professionals
- Webinar recordings on individual pests or diseases
- Posters on individual pests and disease to help maximise awareness
- A pest and disease calendar showing what signs and symptoms to look out for and when
- Easy to use 'Toolkits' designed for public audiences with minimal tree pest or disease knowledge
- Digital learning packages aimed at helping individuals to recognise an unhealthy tree and effectively record its location. This allows follow-up inspections by tree health professionals



All resources produced are located on the project website. This has become the central hub of our project sharing and data dissemination. We have also produced an electronic newsletter, distributed quarterly to a growing list of over 500 individuals who have signed up for further project information.

As part of our wider project outreach, we have also created a display stand and our staff have attended many high profile shows and events to continue to raise awareness of tree health and promote our resources.

Our project staff have given many presentations at seminars and conferences and we have led many successful 'pest and disease walks', where we have shown stakeholders real examples of the types of symptoms we would like them to report.



Reporting tree pests and diseases



Within the UK online reporting tools are available for anyone to report the sighting of a tree pest or disease. Tree Alert is used within Britain whilst a similar system, Tree Check, is used in Ireland. Both systems are monitored by tree health scientists and inspectors. This allows important reports to be swiftly investigated with follow-up actions if necessary. Observatree has promoted the use of these reporting channels both within the volunteer network and to the wider public.

To prevent tree health teams becoming overwhelmed by the quantity of reports from these online systems, volunteers focus on reporting sightings of our priority pests or diseases or other findings believed to be important. They are also encouraged to report other, lower priority, findings but these are captured via a different mechanism. Specially designed recording forms were developed for volunteers to use during their survey work. This captures all necessary data for scientists to make the most informed diagnosis possible. These data are also entered online and shared with project staff.



Recording the host species affected



Recording where samples have been taken from

At the beginning of the project we investigated whether producing an app for a mobile device would be of benefit for data collection. However, we decided not pursue this approach because the quantity and quality of data and images required for a good diagnosis cannot be captured effectively via an app especially in remote woodlands where mobile signals are weaker. Additionally the unforeseen rapid development and launch of Tree Alert in Britain following the outbreak of Ash dieback in 2012 also lessened the need to develop a reporting tool for Observatree. We will review this decision in the future as mobile technology continues to develop.

Observatree
monitoring tree health

Our green and pleasant land?

When William Blake first penned his 1804 poem *'And did those feet in ancient time'* he conjured up visions of a nation full of lush landscapes and rolling vistas, habitats for wildlife and a source of economic growth.

Trees are vital habitats for wildlife. Twelve species of bird are associated with ash trees or ash woodland. Bullfinches eat the winged seeds. Nuthatches, chiffchaffs, blackcaps and wrens use the trees for nesting (source: Mitchell et al 2014*).

The UK is at risk of losing millions of trees to pests and diseases which could seriously damage our beloved landscapes and wildlife populations.

Observatree is a project that aims to help protect UK trees, woods and forests from new pests and diseases through early detection and reporting. Early detection gives us the highest chances of controlling or monitoring any outbreaks.

*The potential ecological impact of ash dieback in the UK. NERC report No. 483.

We need your help
While you are out and about, keep your eyes open for signs of three key pests and diseases, which are threatening some of the UK's most iconic tree species.

	Chalara ash dieback Affects: ash trees First UK recording: 2012
	Sirococcus blight of cedar Affects: cedar First UK recording: 2014
	Oriental chestnut gall wasp Affects: sweet chestnut First UK recording: 2015

To help you, we have produced free, downloadable toolkits which include:
• Identification guides • Reporting checklists • Frequently asked questions
Download your toolkit today, visit: observatree.org.uk/toolkits

Funded by the EU's LIFE programme









Placing advertisements in magazines to raise awareness to wider audiences

What we have learned

Sharing good practice

In the interests of working with other stakeholder groups to continue to raise awareness of tree health, and to help other citizen science projects by sharing our lessons learned, we have been keen to collaborate with others. **There are other tree health citizen science projects in the UK and Observatree is working with them to form a network for knowledge exchange partnership working.**

Outside of the UK the success of Observatree has led to collaborations with other plant health citizen science projects and colleagues from 21 other countries to date. We have hosted international conferences and spoken to others about our project, reaching a much wider international audience.

Impact and evaluation

Observatree volunteers have submitted thousands of tree pest and disease reports. This includes sighting of all priority pests and diseases known to be present within the UK.

Unfortunately, Oriental chestnut gall wasp, which creates deformed growth on sweet chestnut foliage, and *Sirococcus tsugae*, a blight of cedars, were first recorded in the UK during the timeframe of the project. The report of Oriental chestnut gall wasp in 2015 by one of our volunteers was only the second reporting of this tree pest in the UK. It was found in a different area to the previous outbreak, leading to follow-up inspections and intervention to help manage the situation.

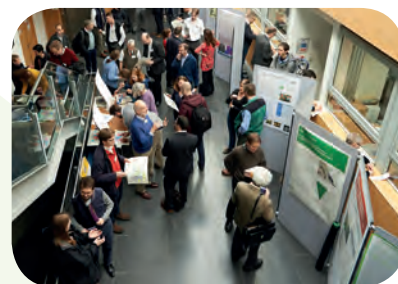
Whilst recording positive results is very important for detecting new outbreaks, unlike many other citizen science projects, Observatree encourages volunteers to submit information on locations where no pests or diseases are found. **These 'negative data' are very important in helping map rates of spread of any tree pests or diseases.** It may identify areas where tree pests or diseases are unable to become established. All mapped results are shared with volunteers, to feedback the outcome of their efforts, and with project partners and stakeholders for information. Over time this will help us to build a comprehensive map of where pests or diseases are causing concern, and allow much more targeted responses to them.

New reports are important and, to some of our partners, the reporting of Oriental chestnut gall wasp alone shows an important value of the project. However, Observatree is about more than reported observations of tree pests or diseases. The value of some of these other indicators of success can be more difficult to measure. For example, a significant role of the project is about raising awareness of tree health and the threat these pests and diseases pose to UK trees. We are keen to promote these issues to a wider audience.

In addition to providing information and resources to volunteers, our communications team have placed printed and digital advertisements in targeted media, given talks to interested groups and participated in shows and events targeting key audiences. We have provided training for stakeholder groups. **Public information boards about the project, featuring local pests and diseases, have been placed in sites where they will be seen by members of the public.**



Hosting a tree health conference



International networking

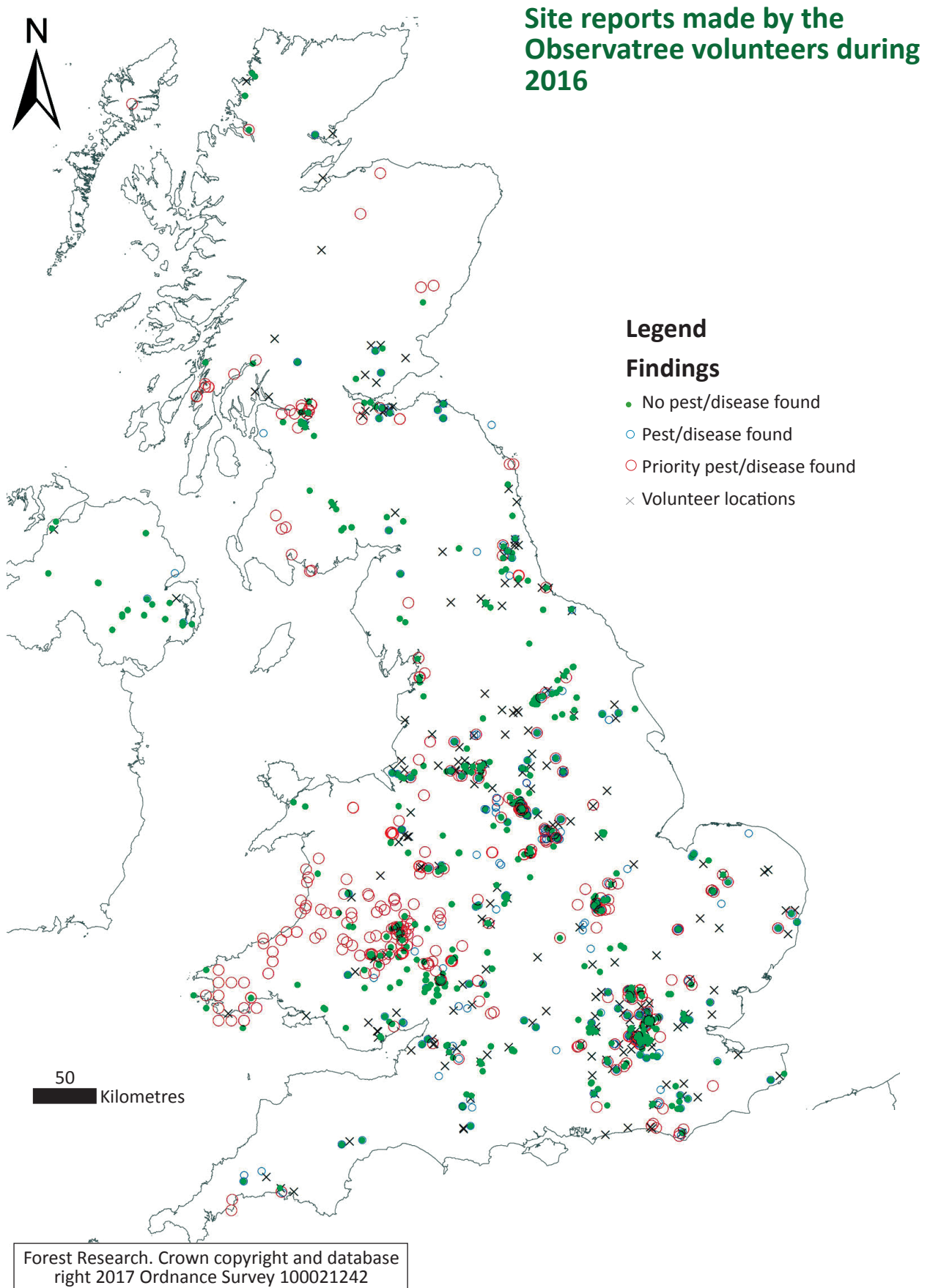


Participation at shows and events



Telling the public about pests and diseases in their local woodlands

Site reports submitted by our volunteers



Life beyond Observatree

For many of these activities we can capture some measurable data such as the number of events attended or participants taking part in stakeholder training events. However it is difficult to know how many people have read our information boards or seen our display stand at an event and whether they will be more vigilant for pests or diseases as a result. Many of our volunteers have added value by giving presentations of their work to other local interest groups in their area. This spreads the message of tree health to ever-wider audiences. **The impact of this wider dissemination is difficult to assess and benefits may only be seen in the longer term.**

In the last few years of this project there has been an increase in reporting of tree pests and diseases through publicly available systems such as Tree Alert. There is no doubt that Observatree’s communication activities contribute to this increased activity, although measuring the extent of this impact is challenging. Ultimately, all activities that help raise awareness of tree pests and diseases, and the mechanisms to report them, are a good investment. Audiences we have reached who are not reporting pests or diseases at this time may be prompted to do so in the future, helping to prevent or manage their spread. Raising stakeholder and wider public awareness via our communications activities contributes towards tree pest and disease risk management for the UK.

Observatree has been and continues to be a success. This is reflected in two awards that the project has won for its contributions to Oriental chestnut gall wasp findings (and subsequent reportings) and for the quality and effectiveness of our volunteer network. High quality survey data submitted by volunteers, scientifically backed training and educational resources, combined with successful media promotion, have allowed Observatree to grow and become a well-known and reputable brand that continues to be a pioneering project for UK tree health citizen science. One of the original project aims was ‘to establish a tree health citizen science network’. This network is established and volunteers are making a significant contribution towards tree health in the UK. For these reasons, project partners are working towards a continuation of the project beyond this initial establishment phase. We hope that Observatree will be with us for many years to come and continue to prove its value in our shared desire to protect tree health.



Our award winning project



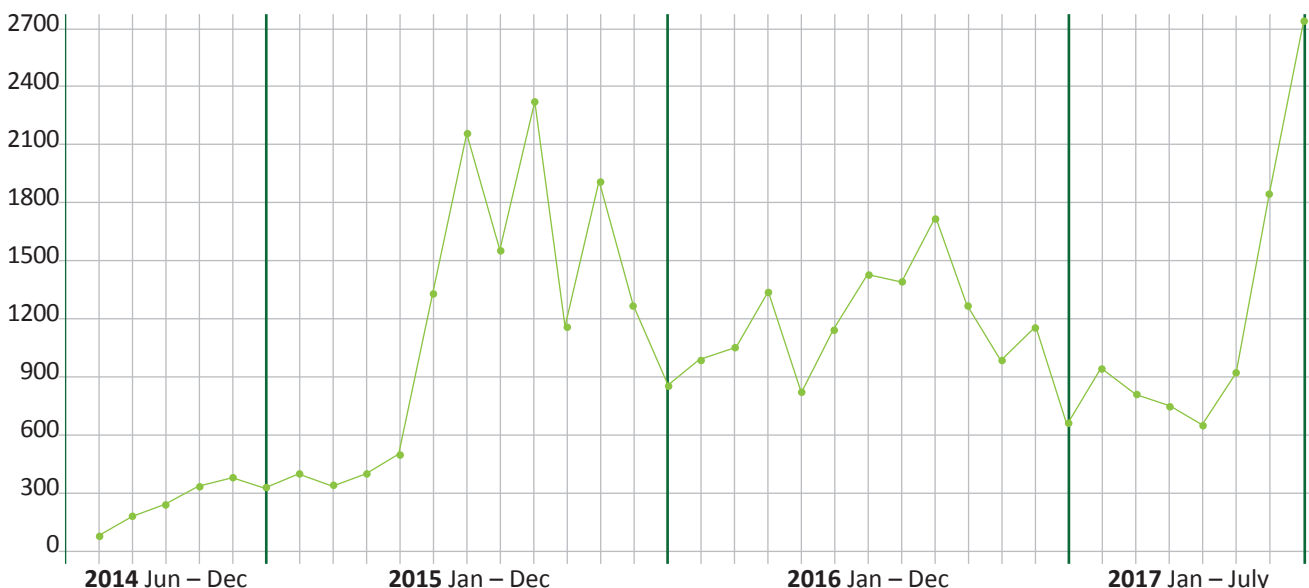
Recognition of a successful collaboration



Speakers promoting the project at our Parliamentary Reception

Web visits June 2014 – July 2017

Graph shows growth in website visits plus ‘spikes’ as a result of advertising campaigns and initiatives





For more information about **Observatree** and **Tree Alert** visit
observatree.org.uk

Funded by the EU's LIFE programme



Funded by the EU's Life+ Programme, Observatree is a partnership project. Led by Forest Research, the research agency of the Forestry Commission, partners are Fera Science Ltd, the National Trust and the Woodland Trust. Supporting the project are APHA, Defra and Natural Resources Wales.

The Woodland Trust and the National Trust are registered charities. The Woodland Trust logo is a registered trademark. Job No. Laymans-2017-08
Cover photo: Observatree