Department for Environment Food & Rural Affairs

A Plant Biosecurity Strategy for Great Britain

Consultation

August 2021

Llywodraeth Cymru
Welsh Government

Scottish Government
Riaghaltas na h-Alba
gov.scot

Forestry Commission

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Acknowledgements

This consultation has been launched by Defra, Forestry Commission, the governments of Scotland and Wales, and our agencies and delivery partners, to inform Great Britain's (GB) approach to plant biosecurity over the next five years.

The new approach will build upon the previous Plant Biosecurity Strategy for GB published in 2014[1]. Our[2] refreshed biosecurity approach will be developed in collaboration with our partners through established forums, and from the views of the public through this consultation.

In the lead-up to this consultation, stakeholders responded to an informal call for ideas that helped shape this document and provided valuable points of reference. We would like to thank the following organisations and groups for providing material and input in response to this call:

- Agriculture and Horticulture Development Board
- The Arboricultural Association
- British Association of Landscape Industries
- Department of Agriculture, Environment and Rural Affairs
- Fitter Flora
- Forestry and Climate Change Working Group
- Grown in Britain
- Horticultural Trades Association
- Animal and Plant Health Agency
- National Farmers Union
- Ornamental Aquatic Trade Association Ltd
- Ornamental Horticulture Roundtable Group
- Royal Horticultural Society
- Tyfu Cymru
- Woodland Trust
- Tree Health Policy Group
- UK Plant Health Alliance Steering Group
- UK Plant Health Advisory Forum

[1] 2014 GB Plant Biosecurity Strategy

[2] The term 'we' and 'our' is referenced throughout the consultation. In almost all instances, it refers to Defra, Forestry Commission, Scottish Government and/or Welsh Government.

Purpose

This consultation has been launched to help us engage with people who have an interest in, and responsibility towards, plant health. Your responses will help inform the new GB Plant Biosecurity Strategy that will be published in 2022. The new strategy will set out a vision for plant biosecurity over the next 5 years. Delivery of the strategy will be coordinated across England, Scotland and Wales through the new Plant Health Common Framework (a commitment to continue joint working in order to establish a common approach, where devolved competence intersects with powers that have returned from the EU[3]). The scope of this consultation is limited to biosecurity of plants and plant products (including but not limited to trees, vegetables, fruits in the botanical sense, wood packaging material, cut flowers etc)[4].

In parallel to the consultation on the overarching strategy, we are also launching a more detailed technical consultation on additional biosecurity measures for tree species posing a particular risk of pest introduction through imports. This technical consultation (**Annex A**) will look at specific biosecurity risks associated with importing trees and whether further measures should be introduced in the future to strengthen our biosecurity regime. We welcome responses on this more technical consultation in addition to the questions in the main document.

To help us analyse responses we would like to know who you are. Questions in this section provide us with important information as to whether your interest is as a member of the public, a business owner, an academic or on behalf of an organisation. Understanding this information allows us to understand how different sectors of society would like us to approach biosecurity and will help us contact you to develop proposals if needed.

Questions 1-6

1. **Would you like your response to be treated as confidential?** (please see this consultation's confidentiality statement)
   - Yes
   - No

2. **If you answered Yes to this question, please give your reason.**

[3] This framework, along with the GB regulations in place across administrations, will seek to maintain the adoption of common plant health rules across GB/UK, whilst respecting the potential for divergence and managing the ability for one administration to take a different approach where technically justified.

[4] The definition and exhaustive list of plant and plant products in our regulation can be found here.

3. **What is your e-mail address?5**

4. **What geographical region are you from?**
   - England
   - Scotland
   - Wales
   - Northern Ireland
   - Other

5. **Please tell us which of the following options best describes your interest in plant health? Please select one option.**
   - a member of the interested public with a personal opinion
   - a landowner or land manager
   - a forester
   - an arboriculturist or another tree professional
   - a farmer
   - a business that grows and sells plants or plant products to trade
   - a business that grows and sells plants or plant products to the public
   - a business that only sells or trades plants online, with no physical premises
   - a member of the landscaping sector
   - a member of the education sector
   - involved in research or plant health science
   - local government
   - an environmental non-government organisation
   - a professional body
   - if not specified above, please state your interest (max 25 words)

6. **If applicable, what is the name of the organisation you are responding on behalf of?**

[5] If you enter your email address, you will automatically receive an acknowledgement email when you submit your response on Citizen Space.

Foreword

Plants are vital to our survival. They provide us with food to eat, the oxygen we breathe, and contribute to our wellbeing. They play an essential role in ecosystems, mitigating and adapting to the effects of climate change, and play a key role in our economy. However, the threat from plant pests and diseases is significant and growing because of increasing globalisation and environmental change. Climate change supports the establishment and spread of non-native species that were previously unable to survive in some areas. New introduction pathways have developed due to global changes in plant production and due to an increasing volume and diversity of plants and plant products entering and moving around GB. Now is the time for a refreshed approach to mitigate the increasing risk of plant pests and diseases that threaten our crops, trees, parks and gardens and beloved countryside.

Recognising that pests and pathogens do not respect national boundaries, our three nations have agreed to align around a common biosecurity vision and act together. Building on the firm foundation of the 2014 GB Plant Biosecurity Strategy, this new five-year strategy will also be prepared on a GB basis, with Defra and the governments of Scotland and Wales working in collaboration.

Northern Ireland has an all-island approach for plant health, upholding the longstanding status of the island of Ireland as a single epidemiological unit. Great Britain is also a single epidemiological unit, for this reason, the new Plant Biosecurity Strategy will apply GB-wide, as per the existing 2014 strategy.

The arrangements established under the plant health framework reflect Northern Ireland's integral place in the United Kingdom and provide the necessary consensus-based governance and dispute resolution mechanisms to facilitate continued cooperation between all four UK administrations on plant health matters.

We will continue working closely with the Northern Ireland Executive (Department of Agriculture, Environment and Rural Affairs) to ensure the best possible protection for the UK, while recognising the importance of close collaboration with the Republic of Ireland to strengthen biosecurity for the whole island of Ireland.

It is important to note that the government has outlined a new approach for arrangements in relation to Northern Ireland in the Command Paper 'Northern Ireland Protocol: the way forward', which was published on 21 July 2021. The Command Paper sets out proposals which will ensure that processes in place on regulated plants and plant products moving East-West are based on genuine risks and remove undue frictions on those remaining in the UK whilst applying EU law processes in full on those moving on into the EU. The priorities of the new Plant Biosecurity Strategy are consistent with these proposals i.e.

maintaining our high domestic biosecurity standards whilst keeping trade as frictionless as possible.

Our new strategy needs to focus on supporting our domestic growers and nurseries, whilst improving biosecurity and ensuring our consumers continue to enjoy access to a wide range of products.

We are delighted to open this public consultation on a new Plant Biosecurity Strategy for GB. Everyone who has an interest in, and benefits from, the health of our plants needs to commit to putting biosecurity at the heart of everything we do, and we look forward to your ideas about how we can achieve this.

The Rt Hon Lord Benyon	**Julie James MS**	**Màiri McAllan MSP**
Minister for Rural Affairs and Biosecurity	Minister for Climate Change, Welsh Government	Minister for Environment, and Land Reform, Scottish Government

Introduction

In 2012, ash dieback was first detected in the UK. This fungal disease, which is often fatal to our native ash, arrived here not only naturally as wind-blown spores, but also through the importation of infected ash trees. Most parts of the UK are now experiencing ash tree decline. Research suggests that over 100 million of our trees may die from this disease and the cost to our economy will be around £15 billion over the next 100 years (in clear up costs and lost ecosystem services[6]).

The arrival of this devastating pathogen on our shores was a landmark moment, triggering a step change in public awareness and the government approach to plant biosecurity. The subsequent 2014 GB Plant Biosecurity Strategy set out the government's response and

[6] Source: Hill, Jones, Atkinson, Hector, Hemery & Brown, Current Biology 29, R1–R3, May 6, 2019

significant progress has been made against those recommendations over the last seven years. However, the biosecurity threat has not diminished. Whilst the biogeography of the British Isles means that some plant pests and diseases will continue to arrive here naturally (a recent example is the eight-toothed spruce bark beetle (*Ips typographus)* discovered in Kent in 2018 and currently under eradication), climate change and growing globalisation in travel and trade is intensifying this background risk, and threats to plant health are increasing across all sectors, including agriculture, horticulture, and forestry. Furthermore, GB production does not currently meet our demand for plants and plant products. Trade in plants and plant material is essential for many reasons such as food security, so partnership working between government and industry is essential for managing and reducing the threat of importing pests and diseases.

We must continue to evolve and strengthen our plant biosecurity regime if we are to prevent new plant pests and diseases being imported or becoming established, and protect the economic, environmental, and societal benefits that healthy plants provide. Our refreshed GB approach must also work in partnership with the related environment, tree, woodland and forestry strategies of the three nations, and with industry, landowners, Non-Government Organisations (NGOs), the scientific community and the wider public.

Why are plants important?

In the UK, the value that our plants and trees provide to society each year is estimated at £10.5 billion[7]. Healthy plants benefit people, the environment and the economy. Our plants play many important roles in our lives, including:

- **Food security -** the world's food supply depends on around 150 plant species[8].
- **Health and wellbeing -** evidence suggests living in areas with green spaces is linked to improved wellbeing and better health outcomes. Amongst lower income groups, it is estimated that 1,300 extra deaths occurred each year in areas where the provision of green space was poor[9].
- **Carbon sequestration -** plants act as carbon sinks, reducing net carbon emissions and helping to conserve energy. A mature tree can absorb up to 150kg of carbon dioxide (CO_2) per year[10].
- **Cooling -** strategic placement of trees in cities can help to cool the air between 2 and

[7] Based on a collection of published estimates from a range of sources that have been collated/updated by Defra's plant health economists (full details to be published in the 2021 GB Plant Biosecurity)
[8] International Development Research Centre, Canada, 2010
[9] Mitchell, R and Popham, F. 2008. 'Effect of exposure to natural environment on health inequalities: an observational population study'. The Lancet, vol. 372, issue 9650, pp. 1655-1660 presented on NHS Forest
[10] Food and Agriculture Organization of the United Nations, 2016

8 degrees Celsius[10], thus reducing the urban “heat island” effect and helping urban communities to adapt to the effects of climate change.

- **Flood alleviation -** a mature evergreen tree can intercept more than 15,000 litres of water per year[10], helping to reduce the risk of flooding.
- **Air pollution -** our plants and trees also absorb harmful pollutants. An estimated 1.3 billion kg of air pollutants were removed by woodlands, plants, grasslands and other UK vegetation in 2015[11].
- **Noise pollution -** trees absorb sound and reduce noise pollution. Planting "noise buffers" composed of trees and shrubs can reduce actual noise by five to ten decibels and reduce noise to the human ear by approximately 50%[12].
- **Biodiversity -** plants and trees provide vital habitats for a huge number of different species – for example, more than any other native tree, the native oak tree (*Quercus petraea and Quercus. robur*) supports roughly 2,300 species including 38 bird species, 229 bryophytes, 108 fungi, 1178 invertebrates, 716 lichens, and 31 mammals[13].
- **Economy -** in the UK, trade in plants and plant commodities (raw and simply processed commodities) is worth over £14bn annually of which £13bn are imports to the UK[14]. Forestry and primary wood processing are also vital UK sectors generating £2.5billion Gross Value Added a year, from a woodland area of 3.2m hectares[15].
- **Employment -** it is estimated that there are around 43,000 horticulture and landscaping businesses employing 260,000 people in the UK. There are also 26,000 businesses in the UK focused on agricultural crops, employing 122,000 people[16].
- **Tourism –** in 2017, £2.9 bn worth of tourism spending was attributed to parks and gardens, of which international visitors to the UK accounted for over three-quarters of spending[17].

What do we mean by biosecurity and why is it important?

Biosecurity refers to a set of precautions that aim to prevent the introduction and spread of harmful organisms. These include non-native tree pests, such as insects, and disease-

[11] UK air pollution removal, Office for National Statistics, 2018
[12] Noise abatement, Forest Research
[13] PuRpOsE: Protecting Britain’s iconic oak trees and their biodiversity. James Hutton Institute
[14] Plant Health – international trade and controlled consignments, 2015-2019. Defra, 2020 Commodities covered include those which can be described as raw or simply processed
[15] Science and Innovation Strategy for Forestry in GB, 2020
[16] UK Land-based and Environmental Sector: Skills Assessment Update. Spring 2014
[17] The Economic Impact of Ornamental Horticulture and Landscaping in the UK: An independent report by Oxford Economics for the Ornamental Horticulture Roundtable Group, 2018

causing organisms, called pathogens, such as some bacteria and fungi[18]. Biosecurity is as relevant to plant health, as it is to animal and human health.

Plant biosecurity is important because it's about protecting plants and all the values that they deliver. Ultimately, we are totally reliant on plants to survive - they produce the oxygen we breathe and virtually all the food we eat. They also beautify our landscapes and provide habitats and food to support our wildlife, and are essential to our health and wellbeing, our communities and our economy - it is therefore important that we keep them healthy.

Plant diseases such as Xylella have the potential to cost the UK taxpayer millions of pounds a year if it arrives here, which is why it is essential we all play our part in supporting biosecurity and protecting plant health.

Why does government need to intervene?

There is mounting evidence of the devastating impact that plant pests and diseases have. Between 1970 and 2013, 267[19] non-native plant pests were believed to have established in Great Britain. Across Europe, two fifths (42%) of native tree species are regionally threatened with extinction[20]. The UK Plant Health Risk Register provides details of 127[21] plant pests and pathogens that are not currently present in the UK but are considered to pose a significant risk.

Dealing with outbreaks is costly to government and the wider economy. For example, in addition to the ash dieback example cited earlier:

- Eradicating a small outbreak of Asian longhorn beetle (*Anoplophora glabripennis*) in Kent between 2012 and 2019 cost around £2million[22].The cost of managing the same insect in the US has cost approximately $373 million[23].
- Management of *Phytophthora ramorum* outbreaks in the UK cost £23 million between 2009 and 2014, with an annual spend on managing the impacts of Phytophthora estimated at approx. £1.5million per year since then[24].

[18] Prevent the introduction and spread of tree pests and diseases - GOV.UK (www.gov.uk)
[19] Smith R.M. et al. 2018, 'Recent trends in non-native, invertebrate, plant pest establishments in Great Britain, accounting for time lags in reporting'. Agricultural and Forest Entomology, vol. 20, pp 496-504
[20] Analysis of European Red List of Trees, 2019
[21] Analysis of UK Plant Health Risk Register, Defra based on pests/disease with an unmitigated score of 60+
[22] Fielding et al (2016) History and development of an isolated outbreak of Asian longhorn beetle Anoplophora glabripennis (Coleoptera: Cerambycidae) in southern England, Agricultural & Forest Entomology
[23] Estimated costs of $373 million. Source, Haack et Al (2010): Managing Invasive Populations of Asian Longhorned Beetle and Citrus Longhorned Beetle: A Worldwide Perspective, Annual Review of Entomology, Vol. 55: 521-546
[24] Phytophthora: Report on the Defra funded 5-year programme (2009 – 2014)

- *Xylella (Xylella fastidiosa)*, a plant quarantine bacterium not currently present in the UK, but present in some regions of Italy, France, Spain and Portugal has a wide host range including olives trees and a series of ornamental plants such as oleander and lavender. Impact simulation indicates that *Xylella* has the potential of causing annual production losses of 5.5 billion euros in a scenario of full spread across the entire EU[25].

The scale of the overall costs to society for managing these pests and diseases demonstrates the cost-effectiveness of a biosecurity approach which aims to intervene early to either prevent outbreaks from occurring, or to reduce the scale of the outbreak and thus the ongoing management cost.

The following sections describe the current regime and the measures we have put in place since the publication of 'A Plant Biosecurity Strategy for Great Britain' (2014). We would like your views on how to strengthen this approach, including your views on our new vision and the key components of that future vision. Please answer each question in turn.

In addition, we are also seeking technical opinions on additional biosecurity measures for high risk tree species. The questions for this can be found in Annex A.

[25] European Commission Dec 2019

Future vision

We are proposing the following vision to strengthen our approach to plant biosecurity in GB:

> ***To protect Great Britain's plants through a strong partnership of Government, industry and the public, with the aim of reducing and managing the risks posed by plant pests and pathogens and facilitating safe trade.***

Beneath this vision, we have developed four key outcomes, each with a set of actions for future focus. This document invites your views on each of the outcomes in turn.

Outcome 1: A world class biosecurity regime

Making the most of opportunities to tailor and strengthen our response to prevent and manage the introduction and spread of pests and pathogens that pose a threat to GB plant health.

Outcome 2: A society that values healthy plants

Raising awareness of the importance of healthy plants and trees and encouraging the adoption of responsible behaviours across society.

Outcome 3: A biosecure plant supply chain

Government and industry working in partnership to support a biosecure plant supply chain.

Outcome 4: An enhanced technical capability

Building plant health capability and making use of emerging, innovative science and technology to keep pace with changing threats and ensure preparedness for the future.

Questions 7-8

7. **How can Government, industry and the public work more effectively together to protect Great Britain's plants?**

    - Please explain in no more than 250 words

8. **Which of the following issues do you think poses the greatest risk to plant health? Please rank the following options in order of risk, where 1 is the highest risk to plant health and 6 is the lowest risk to plant health.**

    - Trade imports
    - Personal imports e.g. in passenger baggage
    - Climate change
    - Poor awareness of plant pests and diseases
    - Low levels of knowledge about good biosecurity practice
    - Lack of incentive for organisations and individuals to adopt biosecure behaviours and practices

Outcome 1: A world class biosecurity regime

Making the most of opportunities so we can tailor and strengthen our response to prevent the introduction and spread of pests and pathogens that pose a threat to GB plant health.

***Note**: Building on the regulatory framework and activities set out below, we are also launching a technical consultation on additional biosecurity measures for high risk tree species. This looks at the specific biosecurity risks associated with importing trees and whether further measures should be introduced in the future. To complete this technical consultation, please also answer questions at **Annex A**.*

Regulatory framework

Under the International Plant Protection Convention (IPPC), the UK is required to establish a National Plant Protection Organisation (NPPO). This NPPO function is delivered by Defra on behalf of the UK, and Defra represents the UK in international and European fora.

The NPPO is supported by the UK Plant Health Service (PHS), which comprises of Defra, Scottish Government, Welsh Government, Daera, the Forestry Commission (FC) and their constituent agencies and delivery bodies (e.g. the Animal and Plant Health Agency (APHA), Forest Research and Fera Science Ltd etc).

One of the key responsibilities of the Plant Health Service is protecting plant resources and facilitating safe international trade of plant commodities, through the establishment and implementation of phytosanitary measures. Our regulatory regime prohibits or controls the imports of high-risk plants, planting material, wood and wood products (including firewood). The most recent updates to legislation include:

- Implementation of a new Plant Health Regulation 2016/2031 and Official Controls Regulation 2017/625, both of which strengthened previous legislation and became retained EU law. They were amended to focus on GB when we left the EU[26]. The regulations include:
    - new requirements for the registration of all professional operators (those who

[26] The Plant Health Regulation is enforced and delivered by Scottish Government, Animal Plant Health Agency (APHA), Forestry Commission and local authorities.

produce, store, move or sell plants and plant products).

- an increase in the number of goods which require a phytosanitary certificate.
- a more precautionary approach to trade flows, which provisionally prohibits the import of 'high risk' host plants.
- new requirements for 'priority pests' such as emerald ash borer, which include annual surveying and contingency planning.

- In 2020, the powers to implement a civil sanctions regime were included in English and Welsh legislation. This regime will augment the enforcement tools available to inspectors. There are plans to consult on the details of this in the future.
- In March 2021, a new Statutory Instrument enforced stricter measures against *Xylella* to reduce the risk of it being introduced into GB[27].

Plant Health Regulations following EU Exit

Since the UK left the European Union on 31 December 2020, plant health measures have been reviewed and re-scoped to focus on GB biosecurity risk.

To support businesses to adapt to the new EU-GB requirements, we are introducing the new measures in phases for the import of EU plants and plant material [28] :

- **Phase 1** (Started on 1 January 2021 and ends on 31 December 2021): EU high priority goods require a phytosanitary certificate, pre-notification and a physical inspection at a registered place of destination inland.
- **Phase 2** (Starts on 1 January 2022 and ends in March 2022): A larger scope of EU goods require a phytosanitary certificate and pre-notification. Physical inspections on high priority goods will move from places of destination to Border Control Posts (BCPs). No additional physical inspections are required. (Separate arrangements may be necessary for west-facing ports in Scotland and Wales, details to follow)
- **Phase 3** (Starts in March 2022): All regulated EU plants and products require a phytosanitary certificate, pre-notification and a risk-based physical inspection at a BCP. ((Separate arrangements may be necessary for west-facing ports in Scotland and Wales, details to follow)

We are designing and building new Border Control Post (BCP) infrastructure at the border and working with existing BCPs through the allocation and distribution of the Port Investment Fund to expand and improve current border facilities, both of which will

[27] The Official Controls and Phytosanitary Conditions (Amendment) Regulations 2021
[28] Guidance: Import plants and plant products from the EU to Great Britain and Northern Ireland

increase our capacity for performing official controls. Our inspectors at the border work closely with other government departments and agencies, to deliver an effective, cooperative service.

Since leaving the EU, there has been an increased requirement to conduct plant health inspections of goods imported from the EU to GB, and to inspect and issue phytosanitary certificates for exports of goods to the EU. We want to ensure that businesses can continue to trade with the EU. To support this, we have increased the number of plant health inspectors we employ.

The process for sending plants and plant products to the EU will be the same as the previous process for sending them to non-EU countries[29].

Controls following EU Exit on personal imports

Controls of personal imports from the EU and on EU passengers are being phased in to be consistent with controls on commercial goods. This includes goods brought into GB via passenger baggage, post or courier. This phased approach requires personal imports of high-priority EU goods to be accompanied by a phytosanitary certificate from 1 January 2021. From 1 January 2022, personal imports of all regulated plants and plant products arriving from the EU will also require a phytosanitary certificate.

Given that plant health controls on personal imports from the EU are changing, we will improve public guidance on plant health controls for personal imports. The latest guidance can be found on the UK Plant Health Information Portal.

Northern Ireland Protocol

During EU Exit negotiations, the EU and UK agreed the Northern Ireland Protocol[30] whereby there would be no new checks on goods crossing the border between NI and the Republic of Ireland (ROI). This protocol aims to avoid a hard border between NI and the ROI. It builds on the existing practice established to maintain the Single Epidemiological Unit on the island of Ireland. It ensures integrity of EU's single market for goods, facilitates free access for eligible NI goods to the GB market, and supports the inclusion of NI goods in free trade arrangements between the UK and third countries. This upholds government's policy of unfettered market access in relation to Qualifying Northern Ireland Goods (QNIG).

[29] Guidance for exporting plant and plant products from Great Britain and Northern Ireland
[30] The Northern Ireland Protocol

There are no changes to the way plants and plant products are imported from non-EU countries to Northern Ireland. Imports can continue in the same way as before.

Activity pre-border

The best way of preventing pests and diseases reaching our borders is through effective application of control measures by the producers and authorities overseas. To achieve this the UK operates within a regime determined by international agreements, including our new agreement with the EU.

International collaboration

The UK takes a leading role in driving ever higher international standards, influencing regulations in Europe and beyond, to ensure there is an emphasis on risk-based and evidence led approaches. Our scientists and technical experts actively collaborate with a number of international groups and organisations, including the Food and Agriculture Organization (FAO), European and Mediterranean Plant Protection Organization (EPPO), the International Plant Protection Convention (IPPC) and its expert groups and panels, where our participation enables us to negotiate new and improved international standards for a global benefit.

We have effective approaches to horizon scan and systematically examine information to identify potential threats. Our UK plant health risk group appraises and monitors threats using the UK Plant Health Risk Register[31] which contains details of over 1000 plant pests and pathogens. They assess the biological characteristics of pests and pathogens, evaluate the effectiveness of intervention strategies and consider potential environmental and socio-economic impacts. Risks are regularly reviewed and prioritised for action to ensure our approach remains targeted and cost-effective. We share knowledge internationally through collaboration on risk analysis and work with industry to gain trade intelligence. UK Pest Risk Analyses (PRAs) are published for consultation on the Plant Health Information Portal[32].

Work with exporters in GB and worldwide

We host delegations and visits with exporters worldwide to improve co-operation with other countries and ensure our trading partners understand our phytosanitary requirements. In the future, the UK NPPO will undertake audits in countries where

[31] UK Plant Health Risk Register
[32] Pest risk analyses

phytosanitary issues have been identified, in order to support the exporting country to address any concerns and implement best practice. When appropriate, audits will also be undertaken in response to requests for new market access.

Defra works with our own producers and exporters in England and Wales though the Plant Health Audited Trader Scheme (PHEATS), which was launched in 2020. It is a trade facilitation scheme for the export of fruit, vegetables and cut flowers to the EU and Northern Ireland (NI). This will allow inspections to be carried out by an authorised person(s) rather than by an official plant health inspector.

Activity at the border

Our inspectors carry out targeted inspections of controlled and uncontrolled plant imports and wood imports, including wood packaging materials, at ports and airports to detect any plant health issues at an early stage. They also work collaboratively with Border Force staff in passenger channels at airports and ferry ports to raise awareness of biosecurity issues. Our work with Border Force and trade helps us gain greater intelligence on risk pathways. This intelligence feeds into risk assessments and helps us to make sure that activity is targeted to areas of greatest risk.

The Procedure for Electronic Application for Certificates from the Horticultural Marketing Inspectorate (PEACH) is an online tool which must be used to import certain plants, fruits and vegetables into GB (the PEACH system does not cover Northern Ireland). A new IT system which will streamline the import and export process will be introduced in 2021.

Activity inland

Plant Passporting and Inland Surveillance

While excluding damaging plant pests and pathogen is a key priority, we also want to ensure that any emerging issues inland are detected as early as possible and that measures are in place to prevent the further spread of pests and pathogens which are present in some areas but not others (e.g. Oak processionary moth), and to ensure that established regulated pests and pathogens (e.g. *Phytophthora lateralis*) are not present at unacceptable levels on planting material being traded. This requires a robust system, to provide assurance about the health status of plants being moved within GB, complemented by official and other surveillance.

That is why internal movements of regulated plants and plant products are governed by the plant passport system. This means that plants for planting intended for commercial use (and in some cases when sold to final consumers) must be accompanied by a plant passport, issued by an officially authorised business, providing confirmation that

prescribed pest and disease requirements have been met, and ensuring traceability in the event of any issues arising in the supply chain. The requirement for plant passports to be provided down to retail level, including via online sales, means all traders of plants will have plant health obligations, whether they are a nursery, a landscaper, a high street retailer, or selling solely online.

Plant passports differ from phytosanitary certificates (which govern movements between third countries and are issued by the plant health authority) and the list of commodities which require a plant passport is shorter than those which require a phytosanitary certificate. Operators may also be subject to Growing Season Inspections (depending on the plants they grow) to ensure their plants are free from pests and diseases at appropriate times of year.

Pests and pathogens are not solely introduced to new areas via movements of live plants and plant material. Some pests and pathogens are windborne, and others are transported in wood packing material or soil associated with other imports. We therefore undertake risk-based inspections at nursery sites and wider surveillance in urban and rural environments to detect problems early so that when outbreaks do occur, our agricultural, horticultural and forestry sectors can recover quickly.

Over the next three years we aim to create a new plant health IT system for our inland inspectors, which will be integrated with new border IT systems and support inland surveillance activity and our emergency response to outbreaks. Furthermore, data generated at the border and in-land will be made available to a redeveloped Plant Health Risk Register. It will inform our understanding of biosecurity risks, and guide biosecurity decisions. The current pest-based Risk Register will be complemented by a pathway-based Risk Register capturing the risks associated with movements of plants and plant products.

Preparedness and contingency plans

Evidence from horizon scanning and risk assessments allows us to prepare for the arrival of pests and pathogens. We have a generic plant health contingency plan[33] and pest specific contingency plans to ensure a rapid and effective response in the event of an outbreak. Interdisciplinary research programmes and readiness reviews aim to address gaps in knowledge or preparedness. For example, together with the Biotechnology and Biological Sciences Research Council (BBSRC), Defra and the Scottish Government co-

[33] Generic Contingency Plan for Plant and Bee Health in England and Pest specific plant health contingency plans

funded the £5m BRIGIT research programme [34] which aims to build the UK's capability to respond to a Xylella outbreak.

To enhance protections against specific pests, we have introduced emergency national legislation to reduce the risk of spread within the UK including, for example, the outbreak of the eight-toothed spruce bark beetle (*Ips typographus)*.

Questions 9-15

9. Where do you/your business currently get information on plant pests and diseases from? Please select all that apply.

- Search on the internet myself
- Rely on expert advice e.g. from an agronomist or a plant health inspector
- Information from organisations in the plant health sector e.g. email or newsletter from a trade body, levy board, professional organisation, charity, NGO etc
- Industry media e.g. specialist news online
- General media e.g. national or regional newspapers and online news
- Plant Health Information Portal[35]
- Government websites
- None of the above
- I don't seek information on plant pests and pathogens

10. What information on plant health and biosecurity do you/your business need from government? Please select all that apply.

- Information on emerging pests worldwide
- Information on emerging pests in the UK
- Information on action being taken against specific pests
- Background information on new legislation and why it has been introduced
- Updated guidance on the requirements for imports and exports
- Information on good biosecurity practice
- Information on how to report on notifiable pest and pathogens
- Not applicable
- Other- please explain in no more than 100 words what you would find useful

[34] BRIGIT: Surveillance and response capacity for Xylella fastidiosa
[35] Plant Health Portal

11. Do you/your business currently feel you have the right information to select suppliers that will supply biosecure stock?

- Yes
    a. If you answered yes, what information is most helpful? Please explain in no more than 100 words
- No
    b. If you answered no, what information would you welcome that is currently missing? Please explain in no more than 100 words
- Not applicable

12. Biosecurity is a shared responsibility and sharing information is key to success. Would you be willing to engage with others to share information to better protect UK biosecurity? Please select all that apply.

- I would be willing to pass on information to other organisations
- I would be willing to signpost information to others when I become aware of it
- I would be willing to participate in a network of individuals/organisations who share information

13. Do you feel you know enough about plant pests and diseases to be able to trade responsibly and in line with regulation?

- Yes
    a. If yes, what information has proved most helpful. Please explain in no more than 100 words
- No
    b. If no, what information do you need that is currently missing. Please explain in no more than 100 words
- Not applicable

14. Before you import plants or plant products by post, or in your personal luggage into Great Britain, where would you look for information on import requirements and restrictions? Please select all that apply.

- Gov.uk
- Plant Health Information Portal
- Courier company websites
- Transport websites (e.g. airports/ train stations)
- At transport locations (e.g. airports/ train stations)

- None of the above. I wouldn't look for this information
- Other – please explain in no more than 50 words

15. How important is biosecurity as a consideration when you are deciding whether to bring personal imports of plants and plant products into Great Britain? Please select one option.

- Very important
- Quite important
- Not very important
- Not important
- Not a consideration

Outcome 2: A society that values healthy plants

Raising awareness of the importance of healthy plants and trees and encouraging the adoption of responsible behaviours across society.

Raising awareness

As with our overall approach to plant health, we work collaboratively with organisations in the plant sector to develop and deliver public awareness messages on plant biosecurity. Last year, in collaboration with over 15 organisations, we launched a campaign for the International Year of Plant Health 2020. This included the UK's first National Plant Health Week, the launch of a new children's activity book called 'Izzy the Inspector'[36], (also published and translated to Welsh, titled "Anni yr Archwilydd"[37]) and a public facing website[38]. Scotland's Plant Health Centre has released a set of 5 Key Principles to mark UK Plant Health Week, outlining important steps to protect Scotland's plant resources. [39]

Other awareness campaigns have included APHA's 'Don't Risk It' (adapted from the EPPO campaign) which encouraged the travelling public not to bring plants, flowers, fruit or vegetables back into the UK. This included targeted campaigns at Glasgow, Edinburgh and Manchester airports and major ports.

The FC's 'Keep it Clean' campaign also provides simple practical advice to foresters, arboriculturists and landscapers and members of the public on measures they can take to help limit the spread of pests and diseases. The Welsh Government has been raising awareness through the Wales Plant Health Sentinel Site Network whose members include parks and gardens across Wales[40].

Education sector

Education at all ages is vital for people to build an understanding about the importance of plant health and the need for good biosecurity practices. Government and the plant health sector have taken a range of actions to address the low levels of knowledge and skills

[36] Izzy the Inspector book
[37] Anni yr Archwilydd
[38] Plant Health Action
[39] Plant Health Centre
[40] Wales Plant Health Sentinel Site Network

shortages in the sector. To date, we have taken a number of steps to build capability, including:

- Collaboration with the Gatsby Foundation and the Royal Society of Biology to incorporate communicable plant diseases into the GCSE and A-Level curriculum..
- Introducing the application of biosecurity and phytosanitary measures for pests, pathogens, and invasive species, into the curriculum of National Apprenticeships for level 2 and level 3 horticulture or landscaping operatives.
- Establishment of a plant health level 4 qualification by the Scottish Qualifications Agency in 2012. Crop protection is also included in the Scottish Higher Education curriculum.
- Launch of Plant Health action website where the public, parents and educators can access educational resources on plant health[38].
- Funding undergraduate studentships at a Higher Education level across key institutes around the UK. Defra also supports the Gatsby Plant Sciences Summer School for 80 undergraduate students.
- Working with Harper Adams University to develop the UK's first Master's degree on Plant Pathology, and fellowship opportunities for post-graduates, to prepare students for careers in plant pathology. Similarly, Scotland's Rural College now offers a Master's degree in Sustainable Plant Health.
- The Scottish Forestry Trust run a Tree Health Scotland Bursary Award Scheme to support research on tree pests and diseases in Scotland.[41]
- The British Society of Plant Pathology also offer a range of bursaries, fellowships and grants available for students interested in plant pathology[42].

Professional training

We work with professional bodies to embed greater awareness of plant health as a key competency in professional training. Activities we have undertaken include:

[41] Tree Health Scotland Bursary Award Scheme

[42] The British Society for Plant Pathology (BSPP)

- In 2016, the Royal Society of Biology, in collaboration with Defra, launched the plant health professional register for government inspectors and related officials, to enhance their official training programme to provide a better and more professional service.
- Our inspectors provide regular on-site training to plant and woodland sectors including landowners, managers, agents, specialist contractors, volunteers and NGOs.
- FC's biosecurity e-learning package consisting of 5 modules was developed with APHA, the Arboricultural Association and the British Association for Landscape Industries. It provides background information about biosecurity issues, and clear guidance on the most effective and appropriate biosecurity measures for different situations.
- The Plant Health Alliance provides training and guidance on its Plant Healthy website[43], including a self-assessment tool and five online learning modules based on the published Plant Health Management Standard[44].
- In May 2021, online training for GB operators required to issue plant passports was launched. It will help professional operators who wish to become authorised, or who are already authorised to issue Plant Passports and to maintain compliance with this system. This training was delivered by Defra, APHA and Horticultural Trades Association (HTA)[45].

Across GB, many organisations are in the process of developing and launching their own professional training schemes to ensure their sectors understand the importance of plant biosecurity. This includes the RHS and the Institute of Agriculture and Horticulture (TIAH).

Furthermore, AHDB provide a number of online resources in their Knowledge Library and Events with particular focus on how to effectively manage pest and diseases in arable agriculture and horticulture[46].

Citizen Science

Our governments have worked with partners from the public and charitable sector to develop a tree health early warning system to support official surveillance. Observatree[47] led by Forest Research, is a collaboration between government, Fera Science Ltd, the Woodland Trust and the National Trust who have developed a UK wide network of over 200 trained volunteers to survey trees and report the presence of 22 high priority pests

[43] Plant healthy website
[44] Plant healthy e-learning modules
[45] Plant passporting e-learning module
[46] AHDB Knowledge Library
[47] Observatree

and pathogens[48]. Volunteers have completed over 8,000 surveys in six years and reported suspect cases of 12 of the 22 priority organisms shaping both policy and operational decisions. Central to Observatree's success has been the reporting connection to a central database known as TreeAlert run by Forest Research, that feeds into the government surveillance system.

Guidance and toolkits

We work with our partners across industry to develop information on plant pest and diseases. This includes toolkits and guidance to enable access to accurate and up-to-date information on plant pests, and how best to manage them.

UK Plant Health Information Portal

The UK Plant Health Information Portal[49] is a system providing information about plant pests and diseases, including risk assessments undertaken by government and the data underpinning those assessments. Also included are links to other sites of interest, including non-government sites, as well as information on the plant health controls and services provided by government.

The Plant Health Portal will be re-developed over the next three years to aid the commercial and public sectors in safeguarding plant biosecurity by making relevant information available in an accessible and timely manner.

Toolkits and other guidance

Government publishes an extensive range of guidance for plant health operators, foresters and landowners across Great Britain, including guidance on how to manage specific pests and diseases such as ash dieback or oak processionary moth. In 2019, the Ash Dieback Action Plan Toolkit, was published by The Tree Council working with Fera Science Limited. The toolkit brought together guidance and case studies from Local Authorities in England already tackling the issue. The toolkit has been viewed over 23,000 times to date[50]. The ash dieback toolkit has recently launched in Scotland and work is underway to replicate this for authorities in Wales. A similar toolkit is also in development for Oak Processionary Moth (OPM).

[48] UK Tree Health Citizen Science Network
[49] UK Plant Health Information Portal - UK Plant Health Information Portal (defra.gov.uk)
[50] Figure from Tree Council (April 2021)

Questions 16-20

16. Do you support the intention to encourage society to play a more active role in helping to protect plant health?

- Yes
    a. If yes, what do you or your organisation see as the main potential benefit? Please explain in no more than 100 words
- No
    b. If no, what do you or your organisation see as the main potential drawbacks? Please explain in no more than 100 words
- I don't know

17. In order to raise awareness of the risks to plant health and encourage people to act responsibly, what do you think is the most effective message for use in a promotional campaign? Please rank in order of preference, where 1 would have the most impact and 3 would have the least impact.

- Promotional campaigns to raise awareness of the values of healthy plants
- Promotional campaigns to raise awareness of the threats to plant health
- Promotional campaigns to make people aware of potentially risky behaviours

18. When would messages on how best to protect plant health have the most impact? Please select one option.

- When people are buying plants
- When people are leaving and re-entering the UK for foreign travel
- When people are visiting woodlands and the wider countryside
- When faced with a pest and diseases outbreak on their land or local area
- Other – please explain in no more than 50 words

19. Which learning resources would have the biggest impact in terms of building your own or your organisation's knowledge of plant biosecurity? Please rank in order of preference, where 1 would have the most impact and 4 would have the least impact

- Informal training including webinars covering biosecurity and plant pathology
- Practical training
- Formal education or qualification
- Face-to-face time with Plant Health Inspectors.

20. How can we further enhance the positive contributions of citizen science to plant health? Please rank in order of preference where 1 is the most preferred option and 4 is the least preferred option.

- Encourage more organisations to get involved with projects like Observatree
- Facilitate broader participation by the general public
- Improve accessibility to the data from citizen science projects
- Use the data to support action on the ground

Outcome 3: A biosecure plant supply chain

Government and industry working in partnership to support a biosecure plant supply chain

Working in partnership

Effective biosecurity cannot be delivered by government alone. Our work is supported by extensive engagement with stakeholder groups, including:

- The UK Plant Health Advisory Forum, which ensures stakeholders play a vital role in shaping government policies underpinning our approach to biosecurity and the delivery of measures to support them.
- Sector led groups such as the UK Plant Health Alliance. The Alliance is a cross-sectoral group with membership organisations spanning ornamental horticulture, arboriculture, forestry and general land management as well as trade associations, environmental NGOs and government. It aims to strengthen biosecurity practices across industry and beyond.
- Policy and pest specific stakeholder groups to aid collaboration on critical plant health issues, such as ash dieback and oak processionary moth.

Sharing costs and responsibilities

It is UK Government policy to charge for many publicly provided goods and services. The standard approach is to set fees to recover the full costs of service delivery. This relieves the general taxpayer of costs, so that they are properly borne by users who benefit from a service. It allows for a more equitable distribution of public resources and enables lower public expenditure and borrowing. Most serious pests and diseases that arrive and spread in this country do so via commercial trade in plants and plant produce. Charging for plant health services is consistent with the principle that businesses using these services should bear the costs of any measures to prevent harm that they might otherwise be caused by their actions or inaction. Fees are reviewed regularly to ensure no under, or over, recovery of costs and amended as necessary.

Sharing of costs and responsibilities has proven to be an effective approach - it encourages importers to source biosecure stock. In response to high levels of interceptions, we have seen improvements in the quality of imports. For example, major exporting countries have developed systems of treatments to eliminate pests prior to export to the UK in light of high levels of interception.

Supply chain initiatives

Good biosecurity demands more than just good regulations. It requires everyone to act responsibly, including to improve biosecurity standards and source planting stock from reputable suppliers. There are several assurance schemes across GB aimed at raising standards of biosecurity or certifying provenance:

- The Plant Health Management Standard[51] and its associated Plant Healthy Certification Scheme sets out 23 separate biosecurity requirements and was launched to the nursery trade in 2020 by the UK Plant Health Alliance. It is designed to mitigate and protect businesses from the risks posed by serious plant pests, and to improve the biosecurity and plant health management systems of the horticulture, amenity and forestry plant supply chains.
- The Ornamental Horticulture Assurance Scheme is a specialist grower accreditation scheme owned by the Horticultural Trades Association. It aims to raise professional standards in ornamental horticulture in the UK.
- The Woodland Trust's UK and Ireland Sourced and Grown assurance scheme is a voluntary initiative for forest nurseries. It certifies the provenance of stock to buyers and assures that trees have been raised from seed sourced and grown solely within the UK and Ireland for their entire lifespan.
- The Safe Haven Certification Scheme[52] was set up by the GB seed potato industry and hosted by AHDB to provide additional protection to growers and their customers from a range of pests and diseases. The scheme comprises scientifically robust protocols that ensure best practice for seed growing and handling and require businesses who are members of the scheme to be audited annually to ensure compliance.

Supporting domestic production

The UK is a net importer of plants. In 2019, the UK imported an estimated £1.2 billion worth of ornamental horticultural goods[53], with the three key imports being roses, indoor plants and chrysanthemums, despite having similar growing conditions to countries such as the Netherlands, which would allow domestic production of a wide range of plants, plant products and planting material.

Increased domestic production makes an important contribution towards improving biosecurity, together with significant benefits to local economies, environmental protection

[51] Plant Health Management Standard
[52] Safe haven certification scheme
[53] Ornamental horticulture goods value

and sustainability. Initiatives which increase domestic production and grow more trees and plants in this country are welcomed. For example:

- Defra has been working with the sector on an England specific, industry led Growth Strategy for the ornamental sector which aims to identify where there is growth potential for the industry, and where government support could accelerate that growth.
- Through the Nature for Climate Fund (NCF) Defra will also provide up to £10.5 million in 2021-22, to support the sector to increase UK domestic production of diverse, high-quality tree planting material and to enhance biosecurity. A series of capital and research and development innovation grants will be made available to enhance capacity and support the modernisation of both public and private sector nurseries. We will invest in tree seed production, processing and storage to enhance the quality, quantity and diversity of seed available, and ensure supply chain resilience. Through the development of a Nursery Notification Scheme we will provide nurseries with information about future demand for trees to allow them to meet it.
- In Scotland, Scottish Forestry is providing funding for tree nurseries, small forestry businesses and farmers to help them play their part in creating more woodland. In addition, Scottish Government supports innovative genetic research to support industry grow more resilient potato, cereal and soft fruit crops, as part of a £48m per annum strategic research programme for the environment, natural resources and agriculture.
- Government also works with the timber industry and supports Grown in Britain to increase the amount of home-grown timber used in England in construction, creating a conveyor belt of locked-in carbon in our homes and buildings. 100% of trees planted by Forestry England in a forestry setting are UK grown and this has been the position for last 3 years.

Similarly, to support domestic agriculture production, government supports a number of seed certification schemes to main standards of quality. Separate but similar schemes operate in England, Wales [54] and Scotland[55].

Supporting woodland creation

Growing and protecting UK forests and trees is an integral part of our green recovery and fight against climate change. Our governments are committed to expanding woodland area to help in the climate change challenge.

[54] Seeds certification for England and Wales
[55] Seed potato classification scheme

Efficient and effective management of tree pests and diseases, coupled with longer term resilience building measures, is vital to maintain and expand forest and woodland area, sustain its climate change mitigation and adaptation benefits, economic values and related social and ecosystem services. In addition, the creation of new forests and woodlands can help us adapt to climate change by providing natural flood management and shelter for livestock.

Given the changing climate and greater globalisation of trade and travel, it is also anticipated that the threat to trees from pests and diseases will grow. It is therefore essential that tree saplings are sourced from reputable suppliers who build robust biosecurity practices into every stage of production. Forest owners should consider the appropriateness of the species and provenance of the trees used, and ensure they match the prevailing site conditions.

Our governments provide support for woodland creation and those planning to establish woodlands should seek advice from their respective countries' websites. Examples include but are not limited to Defra's woodland tree health grant [56], Scottish government's Forestry Grant Scheme [57] and Welsh Government's Glastir Woodland Restoration programme [58].

Questions 21-26

21. Do you already belong to an assurance scheme that requires standards of those wanting to join? If so, which one(s)? Please select all that apply.

- Plant Healthy Certification scheme
- Ornamental Horticulture Assurance scheme (OHAS)
- UK and Ireland Sourced and Grown scheme (UKISG)
- None of the above
- Other, please specify in no more than 25 words

22. If you answered yes to Q21, what benefits has scheme membership brought to your business or organisation? Please explain in no more than 50 words.

23. If you are a supplier, what benefits do assurance schemes need to offer you/your business for you to join or maintain your membership? Please select in order of

[56] Woodland tree health grant
[57] Forestry grant scheme
[58] Glastir Woodland Restoration

importance, where 1 is the most important benefit, and 5 is the least important benefit.

- Market access e.g. ability to meet the biosecurity requirements of customers who are demanding stock from accredited businesses
- Improved brand reputation
- Access to exclusive member benefits e.g. insurance, record keeping software, stock management software, training
- Ability to demonstrate commitment to environment sustainability
- Ability to be able to charge a premium

24. What are the barriers to the growth of domestic production? Please rank the following options in order of importance, where 1 is the most important barrier, and 9 is the least important barrier?

- Market access issues for domestic produce e.g. identification of new markets, lack of consumer awareness and demand for domestic produce, logistical issues
- Lack of information for suppliers to be able to predict future demand e.g. lack of long-term supply contracts driven by uncertainties of grant schemes and infrastructure projects
- Attracting new entrants to the sector.
- Consumer perceptions e.g. price, range, quality
- Innovation and technology availability
- Funding and resources available to implement new technology and innovation e.g. financing innovation or financing new product varieties
- Difficulty in sourcing permanent and seasonal labour
- Production overheads
- Competition from overseas suppliers

25. Of the options below, which would be the most effective ways of addressing the main barriers to domestic production that you have identified. Please rank the following options in order of effectiveness, where 1 is the most effective, and 8 is the least effective?

- Promotion activities to increase demand for domestically produced products
- Establishment of collaborative models e.g. producer organisations
- Research and development focused on increasing domestic production
- Use of innovative methods and technology
- Identifying opportunities for growth in export markets
- Ensuring sufficient availability of labour
- Increased use of automation to reduce reliance on labour requirements
- Pre-notification systems to help suppliers and growers predict demand

26. Are there any other opportunities for increasing domestic production besides those indicated in Q25? Please explain in no more than 100 words.

Outcome 4: An enhanced technical capability

Building plant health capability and making use of emerging, innovative science and technology to keep pace with changing threats and ensure preparedness for the future.

Research providers

Building our research and science capability and capacity is pivotal to ensure we continue improving our plant health regime. Governments invest in a wide range of public sector, academic and independent research institutions and organisations to generate evidence that informs plant health policies in GB. Examples include:

- **Government agencies and departments** such as APHA, SASA (formerly known as Science and Advice for Scottish Agriculture) and Forest Research.
- **Executive non-departmental public bodies**, for example: Royal Botanic Garden Edinburgh and Royal Botanic Gardens Kew, that operate at an arm's length from sponsor departments.
- **Research Institutions** such as Fera Science Ltd, the James Hutton Institute, the John Innes Centre, Rothamsted Research, Wales Institute of Biological, Environmental and Rural Sciences and University of Bangor, and Scotland's Rural College.
- Scottish Government also provides annual research funding to its virtual **Centre of Plant Health Expertise**[59] and has recently sanctioned the building of a suite of new plant health laboratories at RBGE.

Industry and the charitable sector e.g. the Gatsby Charitable Foundation, Wellcome Trust, Royal Horticultural Society and Woodland Trust also invest significant resources in plant health and often co-fund projects with government. For example, in collaboration with the Tay Cities Region, Scotland is investing in an international barley hub and a vertical farming facility.

Agriculture and horticulture levy boards have contributed to the application of applied research and knowledge transfer within the industry, whereas the agri-tech sector invests in near market research and product development.

[59] Centre of Plant health expertise

Collaboration across GB

Launched in 2016, the UK Science Partnership for Animal and Plant Health brings together all the relevant government funders of research, along with an independent chair and representatives. The Partnership meets every two months and provides a forum for high-level animal and plant health science coordination and collaboration to prioritise research investment, align strategic agendas and research programmes.

Some recent collaborations on UK plant health research have included:

- **BBSRC Bacterial Plant Diseases Programme** funded through the UK Research and Innovation (UKRI) Strategic Priorities Fund (SPF), in collaboration with NERC, Defra and the Scottish Government. Phase 1 was a £5m collaborative programme on Xylella, called BRIGIT, led by the John Innes Centre, phase 2 is providing £13m for 8 plant health projects.

- **Natural Environment Research Council (NERC) Treescapes Programme** will begin in 2021 and provide £14.5m for projects to inform decision making on the expansion of future treescapes. It is co-funded by Defra, Welsh Government and Scottish Government, AHRC and ESRC.

- **Action Oak** is a new initiative to protect our oak trees, that brings together over 30 different organisations including governments, NGOs, research agencies. The partnership funds research to improve understanding of the threats to our oak trees and inform best management practice, whilst also working directly with owners and managers to protect the species. The partnership is currently overseeing 11 new PhDs on topics relating to oak health.
- **Wales Plant Health Sentinel Site Network**[60] – in 2020, in collaboration with APHA and NRW, the Welsh government launched the sentinel site project. As part of the program, partner organisations will be setting up traps for a range of pests and pathogens across Wales. Sites are being developed for best practice in plant health and awareness raising.
- In 2020 the **Science and Innovation Strategy for Forestry in Great Britain**[61] was published recognising the key role this sector has in reversing the decline in biodiversity, climate change and supporting green recovery. The strategy sets out high level outcomes, themes and areas of research interest, including a theme on tree

[60] Wales plant health sentinel site network

[61] Science and Innovation Strategy for Forestry in Great Britain

health and plant biosecurity. Delivery of the strategy is overseen by the cross-border Research Strategy Reference Group.

At a GB level we will continue to seek strategic opportunities which embrace co-funding, co-design of interdisciplinary research funding calls and close engagement throughout the lifetime of the successful projects to deliver relevant plant health policy outcomes.

International collaboration

Our researchers build and maintain international scientific relationships for mutual benefit. Global collaborations lead to an upskilling of our own capability and ensure rapid, multilateral sharing of research and information on plant health. For example, for high-risk pests which pose a threat but are not present in GB, researchers benefit from working with colleagues in countries where the pests are already established, learning lessons which strengthen our own biosecurity and emergency response activity. As well as collaborating with countries on an individual basis, we also participate in a number of formal networks, including:

- **EUPHRESCO** - though originally a European network, membership is now international and includes representatives from 50 nations including New Zealand, Australia, the USA and Canada that jointly fund and collaborate plant health research. Defra, FC and SASA fund involvement in multiple Euphresco projects each year.

- **International Plant Sentinel Network** – is a global network of botanic gardens and arboreta that provides data and knowledge on specific pests and pathogens. The project is currently being established to monitor for the westward's movement of emerald ash borer, a high priority pest, from its known range of Russia and Ukraine. This project is led by Botanic Gardens Conservation International (BGCI) with technical support from Fera Science Ltd.

The United Kingdom will continue to work co-operatively with research partners in Europe, such as Horizon Europe and Copernicus.

Future research priorities

Robust evidence brought together from a wide range of disciplines and perspectives underpins the risk-based approach to plant health, and all the activities so far outlined under Outcomes 1-3. Research investment is balanced between long-term programmes of strategic research and more applied, responsive research to meet specific needs. Moving forwards science and research will continue to be at the core of the strategy, to help find targeted and evidence-based solutions that add value and reduce costs. We will work with stakeholders, including through this consultation, to define specific priorities for research. Areas of interest may include (but not be restricted to):

- **Risk assessment and horizon scanning** – including understanding pest and pathogen biology, risk factors and pathways, climatic modelling and host vulnerability.

- **Inspections, diagnostics and surveillance** – modelling the distribution and spread of pests and pathogens, new approaches to surveillance such as remote sensing, exploration of new detection and diagnostic tools and optimising citizen science. Identifying consistent approaches and methods for understanding our baseline and reporting changes and incidents.

- **Management of pests and diseases** – including integrated pest management, nature-based solutions such as biological control, guidance and toolkits for landowners and data management tools.

- **Resistance & Tolerance** – understanding genetic variation and the genetic basis for plant tolerance to pests and diseases will allow us to accelerate breeding for existing and future threats, and plant more resilient populations.

- **Planting and managing for resilience** – including approaches to drive long term change to strengthen our plants and landscapes to be more resilient to future threats.

- **Biosecurity behaviours** – understanding what motivates and constrains individuals and groups to achieve biosecurity outcomes, overcoming the knowledge to action gap and the quantification of the social and cultural values of trees and woods.

- **Evaluation** – developing evaluation frameworks, indicator and metrics to help us measure the success of our plant health policies.

Adopting emerging technologies in biosecurity

Putting innovation in the heart of our approach and investing world class products and technologies will not only help to protect plant health, but also drive scientific growth and create skilled jobs for our sector. Working with our partners, we have a rolling program of developing, testing and deploying new technologies, including the elements listed below. We will continue to work with stakeholders, including through this consultation, to understand how best to support development and adoption of emerging technologies in biosecurity

- **Genomic and Phylogenetic technologies** - modern advances in rapid genomics (e.g. LAMP assays and flongle genomics devices), as well as improvements in whole genome sequencing have changed how we deliver routine testing and surveillance over the past 5 years. Examples include barcoding of high-risk trades to help to identify pests that are hard to detect through visual inspection, aerial spore sampling or isotope analysis to confirm the stated origin of timber products. Meta-barcoding approaches can allow us to identify potential risks in the broader environment including of viral and bacterial species that are difficult to identify visually. Gene technologies are also allowing us to better understand genetic diversity in plant populations and how this might be adaptive to local environments and biotic threats. We are also exploring the use of phylogenic signaling to see if this might identify species which might become threats in the UK, even though they are not currently threats in their native ranges.

- **Nature based solutions** - use of chemicals and other standard controls can be costly, require frequent repeat applications and can have unwanted secondary impacts. Nature-based solutions, which covers a range of approaches from classical biological control to integrated pest management (IPM) encourages the use of all plant protection methods from crop rotation to natural enemies and use of resistant varieties and targeted pesticides. It may help us to find more sustainable, lower-risk and more cost-effective ways to control pests and pathogens.

- **Earth Observation and remote sensing** technologies e.g. satellite imagery, drone data capture and Lidar data, are also becoming more commonplace within our biosecurity regime. Advances are allowing high resolution, and often real time, data capture to cover a range of plant health parameters including canopy health, leaf health, growth rates and form, seed production. It’s possible these structural and spectral differences between plants could be linked to genetic or phenotypic indicators of disease of tolerance. We are working with organisations to test satellite derived tree species maps on large scales and to make this data accessible to others.

- **Machine Learning -** mathematical models can be used to optimise the management of plant disease epidemics. However, the conventional approach only allows for comparing a relatively small number of pre-specified intervention strategies in terms of

their effect on an objective. Machine learning, in particular reinforcement learning, is an alternate approach to this type of problem and we are exploring how it can contribute to designing optimal strategies for management of plant pests and diseases.

- **Data capture and interoperability** - plant health issues occur across borders and often require multi-agency responses. We are rolling out mobile data collection tools to our inspectors across GB to ensure that data can be collected in real time and stored in standardised formats in interoperable databases. Doing so will not only provide real-time information in the event of an outbreak, but also a historical baseline of plant health outcomes to interpret changes to pest and disease distribution or abundance, inform future policies and data sharing beyond government.

- **Modelling** – we fund a wide range of modelling activities, from climatic modelling of the likely survival and lifecycle of pests in the UK climate, to the modelling of microclimates within soil or tree canopies and decision support tools to inform our emergency response activity and future policy on particular pests and diseases e.g. *Phytophthora ramorum* and Potato blackleg disease (*Pectobacterium atrosepticum*).

Questions 27-33

27. Do you think government support for research and development is best focused on short-term, reactive R&D projects to address a particular threat, long-term strategic investment, or a combination of these? Please indicate how much government should focus investment on strategic long-term research below on a scale of 0-100. We will infer that you think the remaining proportion should be focused on short-term reactive R&D projects.

Type of investment	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Focus on strategic long-term research	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

28. In order to remain at the forefront of biosecurity, in what areas should GB be focussing R&D investment over the next five years? Please rank the following

options in order of importance, where 1 is the most important and 6 is the least important.

- Risk assessment and horizon scanning
- Inspections, diagnostics, and surveillance
- Management of pests and diseases
- Resistance and tolerance
- Planting and managing for resilience
- Stakeholder responsibilities and actions

29. **Please suggest up to 2 priority research questions for the research topics listed below**

- Risk assessment and horizon scanning (2 questions; max 50 words)
- Inspections, diagnostics, and surveillance. (2 questions; max 50 words)
- Management of pests and diseases. (2 questions; max 50 words)
- Resistance and tolerance. (2 questions; max 50 words)
- Planting and managing for resilience. (2 questions; max 50 words)
- Stakeholder responsibilities and actions. (2 questions; max 50 words)

30. **Are there activities in science, technology or innovation in other sectors (e.g. healthcare) we could learn from? Please explain in no more than 100 words.**

31. **How can GB governments better support development, testing and deployment of science and technology advances to enhance biosecurity? Please explain in no more than 100 words.**

32. **What are the biggest barriers to the adoption of new technologies in support of plant biosecurity? Please explain in no more than 100 words.**

33. **Who should we work with to expand the capability available to support biosecurity research? Please explain in no more than 50 words.**

Annex A – Consultation on additional biosecurity measures for high risk trees

Purpose

This consultation has been launched as an annex to the Plant Biosecurity Strategy consultation to help us gain a deeper understanding of stakeholder views on additional biosecurity measures associated with specific risks from trees. It is not compulsory to complete this annex as part of your response to the Plant Biosecurity Strategy consultation. However, we invite responses from any stakeholder with a specific interest in trees or understanding of tree health.

Your response will help inform policy thinking around pre-border, at the border and inland biosecurity measures for high-risk trees. We will ask respondents about their views on the range of biosecurity measures currently in place and whether measures could be introduced in the future to strengthen the UK's biosecurity regime.

This consultation on additional biosecurity measures originated from a commitment in England's Tree Health Resilience Strategy (2018)[62] to consult on post-entry quarantine. Following informal consultation with stakeholders, this focus has broadened in scope. Post-entry quarantine is one of a range of biosecurity measures we are consulting on. This is to enable respondents to comment on the effectiveness and feasibility of biosecurity measures (such as post-entry quarantine) in comparison to other options. We have also received the consent of the Devolved Administrations to consult on a GB-wide basis. This is in line with the upcoming Plant Biosecurity Strategy, recognising that pests do not respect national boundaries.

Throughout this annex we use the term high-risk trees. For the purposes of this document we have not specifically defined what constitutes a high-risk tree, however listed below are a range of issues that could make a tree higher risk:

- Trees subject to regulations (including emergency measures) due to unsatisfactory pest or disease situation in the originating country. For example, hosts of *Xylella fastidiosa*, emerald ash borer and canker stain of plane.

[62] Tree Health Resilience Strategy

- Trees linked to a specific pest risk, including trees linked to outbreaks or interceptions, in the UK or country of origin. For example, hosts of red-necked longhorn beetle and Asian/Citrus longhorn beetle.
- Trees of a certain size. For example, import restrictions are in place for oak trees over 1.2m due to a greater risk of oak processionary moth on trees above this size.

Current biosecurity measures of note for trees

Outcome 1 of the Plant Biosecurity Strategy consultation sets out the UK's risk-based biosecurity regime, which prohibits or controls the import of high-risk plants and planting material.

It is important to note that under World Trade Organisation (WTO) obligations, tailored restrictions or prohibitions can be introduced if there is strong technical justification to do so. We take a risk-based approach to assessing the need for additional measures led by the UK Plant Health Risk Group. When introducing any new requirements, on a voluntary or mandatory basis, we focus on aspects that will deliver tangible biosecurity outcomes to mitigate/minimise risks. The need for additional measures is kept under continuous review.

All imports of trees must be accompanied by an officially issued phytosanitary certificate, confirming compliance with import conditions. In addition to this, for trees, we have listed below some of the notable biosecurity measures which are in place to protect against the introduction of pest and diseases through trade.

Prohibiting entry of specified plants

The UK regime prohibits the import of more than 30 genera of trees and shrubs from non-EU countries, and we frequently introduce enhanced biosecurity measures to mitigate against emerging risks, for example in April 2021 strengthened measures were introduced against high risk hosts of *Xylella fastidiosa*.

GB Pest-Free Area

GB no longer uses the EU protected zone arrangements. Instead, to manage the risk of quarantine pests which occur in part of GB, the internationally recognised classification of pest free area (PFA) has been introduced, to protect areas of GB where the pests are not known to occur, against their introduction. GB has designated two pest-free areas for trees: one for oak processionary moth and one for bark beetles. Additional requirements apply to movements of specific plants into and within pest-free areas which are beyond plant passports for movement into the infested areas. Other protected zones which the UK had under the EU regime have not been carried forward as GB is free of these pests, meaning that these are treated as any other quarantine pest which is absent from GB.

GB quarantine pest list

The quarantine pest list has been amended to focus on pests which pose the greatest risk to GB. For tree pests and diseases, this includes *Xylella fastidiosa,* emerald ash borer and non-EU isolates of *Phytophthora ramorum*. There are permanent import requirements associated with these pests to protect GB. Outside the EU, GB has been able to strengthen requirements for the imports of specific host species, notably for *Xylella fastidiosa* and canker stain on plane.

Prioritisation of import checks

Import checks are now being conducted on a risk-based approach, with the highest risk goods receiving the most intensive scrutiny. Host species considered to pose the highest risk of harbouring GB priority pests are subject to 100% inspections on imported plants for planting. Plane trees are listed alongside *Xylella* hosts as the highest priority for checks, followed by sweet chestnut, oak, elm, pine, *Prunus*, palm, fir, larch, spruce and ash. All of these tree species are currently subject to import inspections at Places of Destination until Border Control Posts become fully operational.

Pre-border import requirements

Plant health regulations stipulate that certain tree species must originate from pest-free areas before being imported into GB. For example, to prevent against the introduction of sweet chestnut blight, sweet chestnut trees must originate from a pest free country or pest free area. Oak trees are a lower risk host of sweet chestnut blight which means, if they do not come from pest free country or PFA, they can be imported into GB if they are grown at a site with complete physical protection against the introduction of the pest. The option for oak trees to be grown in protected conditions is also reflected in the strengthened national protections against Oak processionary moth.

The Plant Health (Phytosanitary Conditions) (Amendment) (EU Exit) Regulations 2020

GB no longer uses the EU designation of protected zones, and instead uses the internationally recognised term of pest-free areas (PFA). The Plant Health (Phytosanitary Conditions) (Amendment) (EU Exit) Regulations 2020 establishes four categories of regulated plant pests for GB based on international standards:

Category	Description	Example

GB quarantine pests	Pests where we have a comprehensive risk assessment to support permanent import requirements to maintain the whole country as free of those pests.	*Xylella fastidiosa* Emerald ash borer Non-EU isolates of *Phytophthora ramorum*
GB provisional quarantine pests	Provides the protection of GB quarantine pests on a precautionary basis while the necessary evidence is developed and assessed.	Oak long-horned beetle Two lined chestnut borer European isolates of *Phytophthora ramorum*
Pest-Free Area quarantine pests	Protects against the introduction of harmful pests into areas within GB where the pest is absent.	Large spruce beetle *Ips cembrae* *Ips sexdentatus* Oak Processionary Moth
Regulated Non-Quarantine Pest	Allows ongoing protection to prevent the further spread of pests via planting material.	*Phytophthora austrocedri* *Phytophthora lateralis*

Questions 34-38

34. How aware are you of the current biosecurity measures in place for the import of high-risk tree species?

a. Not at all aware
b. Slightly aware
c. Aware
d. Very aware

35. How satisfied are you with the effectiveness of the current biosecurity measures in place for the import of high-risk tree species?

- Not at all satisfied
- Slightly satisfied
- Satisfied

- Very satisfied
- Not applicable

36. Please explain your choice for Q2, in no more than 100 words.

37. What factors are you most concerned about with the import of high-risk trees? Please score each factor between 1 and 5, with 1 being the factor you are most concerned about and 5 being the factor you are least concerned about.

Measure	1	2	3	4	5
Robustness of surveillance methods in exporting country	☐	☐	☐	☐	☐
Unknown pest and disease risks	☐	☐	☐	☐	☐
Robustness of compliance with prescribed pre-export requirements	☐	☐	☐	☐	☐
Robustness of inspections at point of entry	☐	☐	☐	☐	☐
Large trees being imported directly to planting sites	☐	☐	☐	☐	☐
Lack of guidance about risks	☐	☐	☐	☐	☐

38. What do you think are the greatest risks associated with the import of high-risk trees for your business/ organisation? Please answer in no more than 100 words.

Additional biosecurity measures

The previous section set out the current range of biosecurity measures which are in place to protect GB biosecurity. This section focuses on a list of additional biosecurity measures which could be applied on top of existing measures at some point in the future. These are described as additional biosecurity measures as they are intended to be supplementary to GB's current biosecurity regime.

For the purposes of this consultation, we are focusing only on tree species. Again, it is important to note that under the UK plant health regime, mandatory measures can only be introduced if there is strong technical justification to do so.

List of additional biosecurity measures

The additional biosecurity measures are divided into three categories: pre-border, at the border and inland. We have provided the definition of each individual measure. Note some measures are already in place, and the options below are in the context of extending these measures where there is technical justification to do so.

Pre-border

Transport restrictions: A series of measures applying to international movement, determined by the pest biology linked to the host. For example, this could include only transporting high risk hosts at low risk times of year or only permitting travel if the consignment is suitably covered.

Growing season inspections in exporting country: Inspection during growing season in exporting country with timing determined by pest biology.

Pre-treatment or testing of all plants: Pre-treatment or testing depending on the pest or host targeted. This could include: lab testing/destructive sampling before export; treatment/destructive sampling/testing in addition to inspection upon arrival in UK; hot water treatments for roots or fumigation of tree ferns.

Plants grown in protected conditions: Plants grown throughout their life in a site with complete physical protection against the introduction of specific pests and diseases.

Prohibiting entry of specified plants: Banning imports of specified plants based on government-led Pest Risk Analysis, unless the exporting country can prove they are not high risk.

At the border

Tighter restrictions on imports of large trees with soil and growing media: Soil and growing media on plants from non-EU countries is already tightly restricted, and requirements for soil and growing media attached to plants from the EU reflect retained EU law under the Withdrawal Act. There may be opportunities to further enhance requirements for soil/growing media attached to trees/plants being imported.

Only allow imports of resistant species/varieties of plants: Only allow imports of plant species/varieties which have immunity against a plant pest, based on government-led Pest Risk Analysis where there is technical justification.

No imports of trees over a certain size: Trees may be imported if they are under a certain diameter (e.g. below 1cm diameter at its thickest point or measured at the base of a stem).

This option could be used for pests that will only attack, or which could only be present in, plants of sufficient size.

Increasing inspection regime: Increase resourcing into current inspection regimes to reduce risk of contaminated imports.

Risk targeting of official import inspections: Taking account of inspections to be carried out by Plant Health Professionals/Plant Health accredited businesses**.**

Inland

Post-entry quarantine – Absolute Quarantine: A complete consignment of plant species are held in high-security facilities isolated from other trees after entry and with high biosecurity.

Post-entry quarantine – Containment under physical protection: A consignment, or part of it, is held in an approved enclosed structure providing complete physical protection, for a period and officially inspected prior to release.

Post-entry quarantine – Isolation of trees: A consignment, or part of it, is held at an approved site and complies with the status of specified spatial isolation – plants grow outdoors but isolated by a specified distance from other plants potentially at risk.

Growing season inspections before onwards sale: Inspections take place before onwards sale.

Post planting inspections: Where plants for planting are dormant on import, post planting inspections would take place after planting during the first growing season.

Record keeping of planting sites: Enhancing record keeping beyond current plant passporting requirements. Those planting high risk trees must keep records of which imported trees are planted where to improve traceability in the event of an outbreak.

Question 39

39. Please complete the table below to let us know what you think about the measures list above. The table is designed to capture your views on:

- **Effectiveness:** How effective you think the measure is in enhancing GB biosecurity and preventing pest and disease outbreaks associated with high-risk trees. Please provide a score of between 1 and 5, with 1 being the most effective and 5 being the least effective.

- **Feasibility:** How easily you or your business could implement, deliver and comply with the measure? Please provide a score of between 1 and 5, with 1 being the most feasible and 5 being the least feasible.
- **Targeting:** Whether you think the measure should be applied to deal with a particular risk. For example, this could include being applied to a specific tree species, pathway, or size of a tree.
- **Voluntary or Mandatory:** Whether you think the measures should be introduced on a voluntary or mandatory basis?

Measure	Score for effectiveness 1 – 5	Score for feasibility 1 – 5	Should the measure be applied to deal with a specific risk? Please use this space to tell us how the measure should be targeted. Please explain in no more than 50 words.	If you think the measure should be applied, what is the preferred approach – voluntary or mandatory
Pre-border				
Transport restrictions				
Growing season inspections in exporting country				
Pre-treatment or testing of all plants for planting				
Plants must be grown in protected conditions				
Prohibiting entry of specified plants				
At the border				
Tighter restrictions on imports of large trees with soil and growing media				
Only allow imports of resistant varieties of plants				
No imports of trees/plants over a certain size				
Increasing inspection regime				
Risk targeting of official import inspections				
Inland				
Post-entry quarantine – Absolute Quarantine				
Post-entry quarantine – Containment under physical protection				
Post-entry quarantine – Isolation of trees				
growing season inspections before onwards sale				
Post planting inspections				
Voluntary post planting inspections				
Record keeping of planting sites				

Consultee Feedback on the Online Survey

Dear Consultee

Thank you for taking your time to participate in this online survey. It would be appreciated, if you can provide us with an insight into how you view the tool and the area(s) you feel is in need of improvement, by completing our feedback questionnaire.

40. Overall how satisfied are you with our online consultation tool?

- Very satisfied
- Satisfied
- Neither satisfied nor dissatisfied
- Dis-satisfied
- Very dissatisfied
- Don't know

Please give us any comments you have on the tool, including suggestions on how we could improve it.