

Beech (*Fagus* spp.) Pests & Diseases Monitoring Protocol



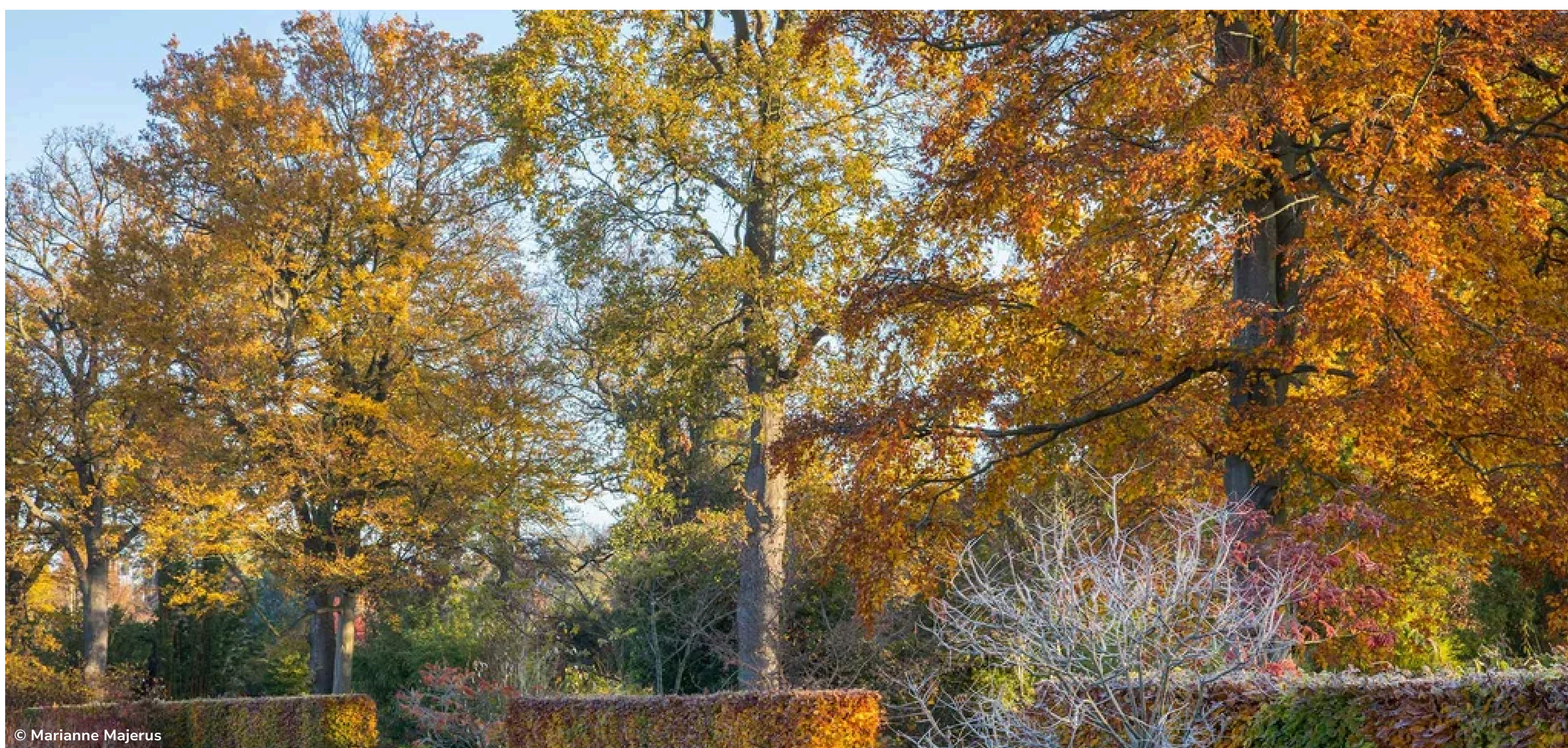
IPSN
International Plant
Sentinel Network



**BOTANIC
GARDENS**
CONSERVATION
INTERNATIONAL

Contents:

Background of the survey.....	3
• Project overview.....	3
• Importance of the survey.....	3
• Target organisms.....	4
• Project timeline.....	4
• Questions.....	4
 Identifying Beech Trees.....	 5
 Survey procedure: Step-by-step.....	 6
 Symptom identification: Target pest & diseases.....	 8
• Beech Leaf Disease.....	8
• Petrakia leafspot.....	9
• Beech Scale.....	10
• Woolly Beech Aphid.....	11
• Look alike.....	12
 Appendix:	
• Other information support resources.....	14
• Survey form.....	15



Background of the survey

Project Overview:

The International Plant Sentinel Network (IPSN), a technical initiative of Botanic Gardens Conservation International (BGCI), is leading a one-year project funded by UK's Department for Environmental, Food & Rural Affairs (DEFRA) to establish a baseline survey of priority pests and diseases affecting beech trees (*Fagus* spp.).

Visual surveys will be conducted in living collections botanic gardens and arboreta across three countries: UK, USA and South Korea. The surveys will be coordinated by IPSN and delivered in collaboration with the [American Sentinel Plant Network](#) and the Korea Plant Sentinel Network.

The aim of the project is to carry out systematic visual inspections of beech trees to detect selected priority pests and diseases, improve our understanding of their current distribution and impacts, and support the early detection of organisms in regions where they are not yet known to occur. The information collected will contribute to international plant health surveillance and help strengthen preparedness for emerging threats to beech trees.

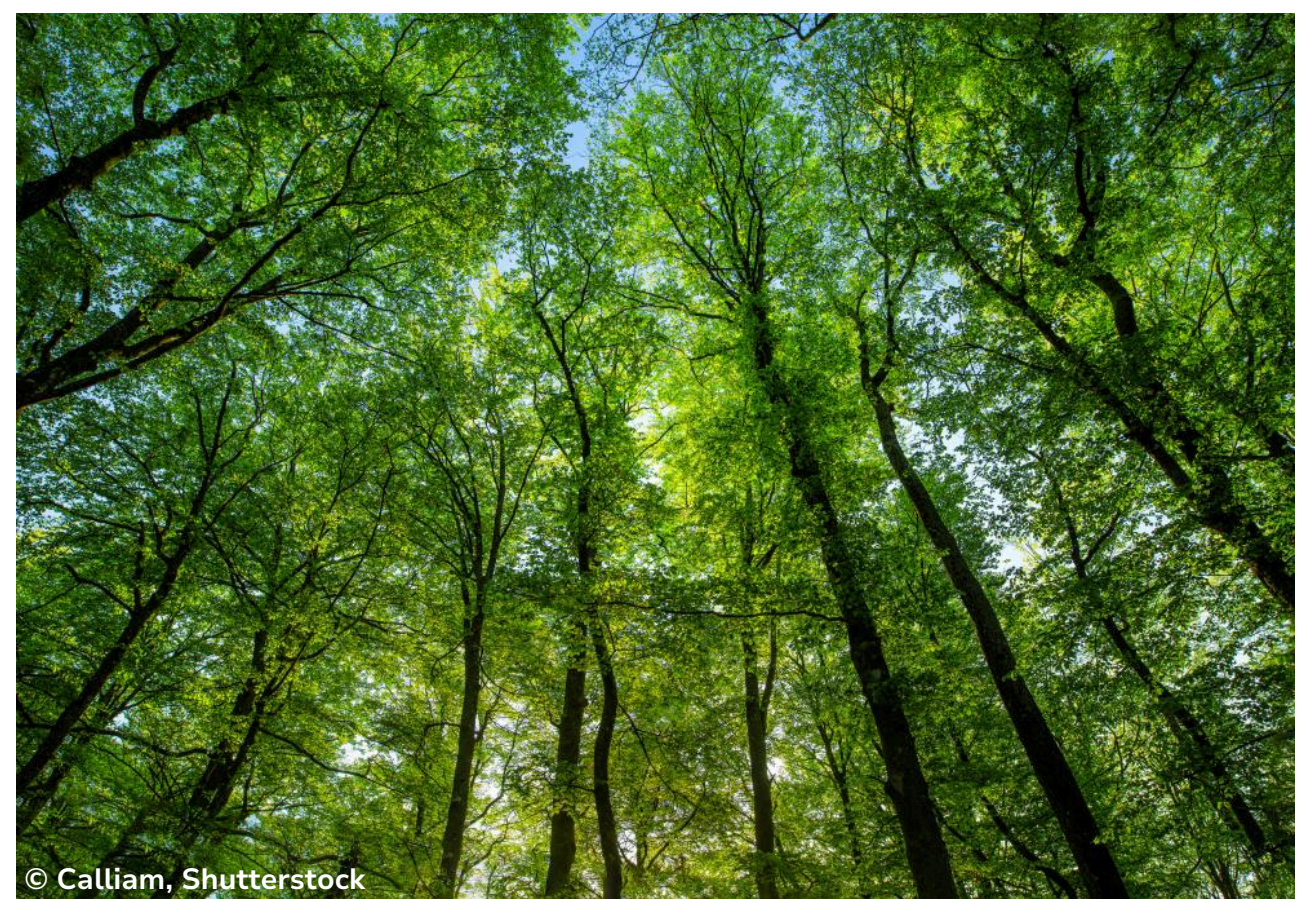
By following this protocol, staff will help safeguard the health of beech trees in their living collections, as regular surveillance is key to early threat detection and effective collection management.

Importance of the survey:

Beech trees are ecologically, economically, and culturally important components of temperate forests throughout the Northern Hemisphere. Beech-dominated woodlands support a rich diversity of plants, fungi, invertebrates, birds, and mammals. Their dense canopy influences forest structure and microclimate, creating unique habitats and contributing to the functioning of forest ecosystems.

Beech trees are also of considerable economic importance. Their timber is valued for furniture making and construction, while many beech species and cultivars are widely planted as ornamental trees in parks, gardens, urban landscapes, and are an important part of botanical collections. In particular, European beech (*Fagus sylvatica*) has numerous ornamental varieties.

Several pests and diseases pose significant threats to beech health, with the potential to affect both natural forests and urban landscapes. Early detection is critical for assessing risks and informing management and biosecurity responses. Botanic gardens and arboreta are uniquely positioned to contribute to these efforts, as their collections often contain a diverse range of beech species and provenances from different regions of the world, including species grown outside their native ranges.



The data collected through this survey will help to:

- Establish baseline information on the occurrence of target pests and diseases.
- Improve knowledge of their geographic distribution and host range.
- Improve understanding of the impacts of target organisms on different beech species.
- Detect potential new occurrences at an early stage.
- Improve plant health understanding of living collections.
- Support plant health preparedness and biosecurity response.
- Contribute evidence to national plant health risk assessments and decision-making.
- Strengthen international collaboration and information sharing on beech health monitoring.

Target organisms:

This survey focuses on four organisms associated with beech trees. Three are considered significant threats to beech health and are priority diseases and pests, while one is included because it is commonly encountered and may be confused with other pests during visual inspections:

Organism	Type	Impact	Status in the UK	Action to be taken
Beech Leaf Disease (<i>Litylenchus crenatae</i>)	Disease	Emerging disease that causes leaf banding, canopy decline, reduced growth, and mortality.	Not know to be present. High risk.	Notifiy Plant Heath authorities via TreeAlert report . Submission of results.
Petrakia Leaf Spot (<i>Petrakia liobae</i>)	Disease	A fungal leaf disease that causes dark lesions and premature leaf senescence.	Not know to be present. Moderate risk.	Notifiy Plant Heath authorities via TreeAlert report . Submission of results.
Beech Scale (<i>Cryptococcus fagisuga</i>)	Pest	A bark-feeding insect that weakens trees and is associated with the beech bark disease complex.	Present and widespread. Occasional damage.	Submission of results.
Woolly Beech Aphid (<i>Phyllaphis fagi</i>)	Pest	A common sap-feeding insect. Causes limited damage but is conspicuous and easily observed.	Present and widespread. Native species.	Submission of results.

Project Timeline:

The project commenced in May 2026 and will run until February 2027. Survey activities are concentrated during the growing season, when symptoms and signs of the target organisms are most visible and easily detected.

Activity	Timeframe
Project start	May 2026
Survey and Monitoring of living collections	June-September 2026
Data submission and analysis	September 2026 - January 2027
Project feedback session	February 2027

Questions:

For more information about the project or if you have any questions, please contact:

- **The IPSN:** ✉ lara.salido@bgci.org / itxaso.quintana@bgci.org

Identifying Beech Trees

Beech trees belong to the genus *Fagus*, a group of deciduous trees in the family Fagaceae. A total of 14 *Fagus* species are recognised worldwide native to the Northern Hemisphere. The most economically and ecologically important species are: European Beech (*Fagus sylvatica*), American Beech (*F. grandifolia*), Oriental Beech (*F. orientalis*), and Japanese Beech (*F. crenata*).

Beech are deciduous, long-lived trees, usually reaching 20 - 40m. Main identification traits include:

Bark	Leaves	Buds	Flowers	Fruits
Thin, smooth and gray in colour.	Simple, alternate twigs, oval to elliptic in shape with finely toothed or wavy edges, and parallel venation.	Long, slender and sharply pointed, they are protended by overlapping bud scales. Can be observed during winter.	Monoecious (male and female flowers on the same tree). Male flowers are drooping catkins on long stalks. Female flowers are usually paired and held upright.	Small, dry, triangular nuts, known as “mast” enclosed in a spiny woody cupule that splits open in autumn.

EUROPEAN BEECH
Fagus sylvatica



Widely distributed across Europe, ranging from southern Scandinavia to the Mediterranean. Native to southern UK and in the British Isles. It is extensively cultivated in temperate regions worldwide.



AMERICAN BEECH
Fagus grandifolia



Its natural distribution spans eastern North America, from southern Ontario and Quebec in Canada, south through the eastern and central United States to northern Florida, and west to eastern Texas and parts of Wisconsin and Missouri.



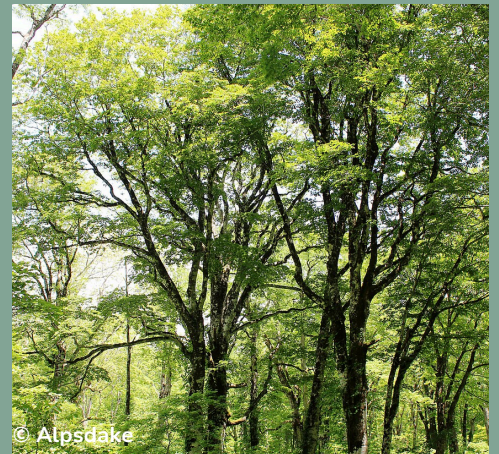
ORIENTAL BEECH
Fagus orientalis



Native to southeastern Europe and western Asia. Expanding from the Balkans through Turkey and the Caucasus region, and eastward into northern Iran.



JAPANESE BEECH
Fagus crenata

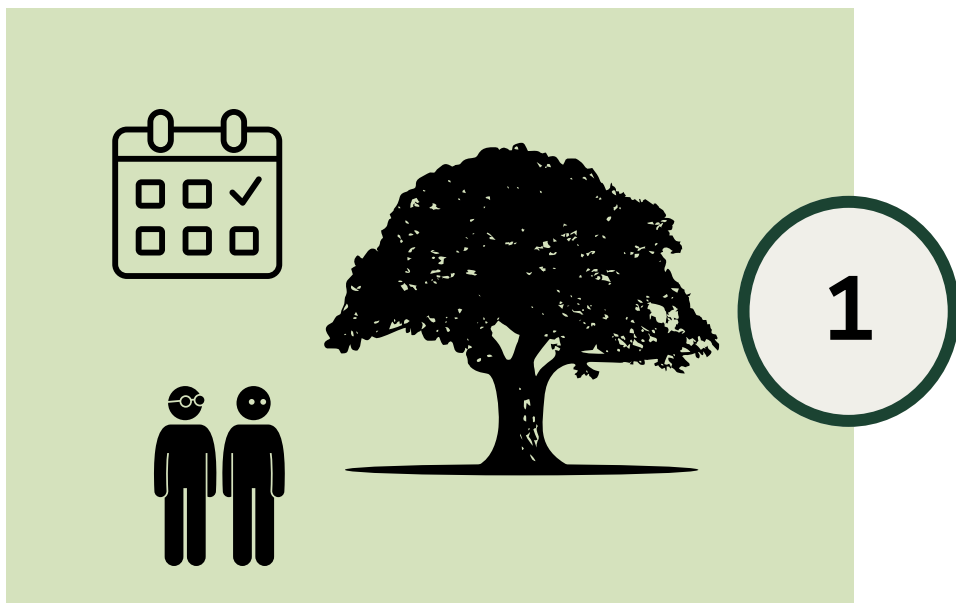


Endemic to the Japanese archipelago. It is a dominant canopy tree in Japan's cool-temperate deciduous forests.



Survey Procedure: Step-by-step

To conduct visual surveys of beech trees in living collections, follow the step-by-step procedures outlined on the following two pages.



When to survey?

During the growing season, when symptoms are most likely to be visible:

- From early summer (June) to early autumn (September)

Frequency:

- **Systematic surveillance:** Ideally conduct visual inspections monthly.
- **Opportunistic surveillance:** Where time and resources are limited, survey beech trees whenever they are encountered during routine activities.
- **Symptomatic trees:** Increase inspection frequency to monitor symptom progression.



Select trees to survey

Include **different beech species, varieties, or provenances** (if present in your collection):

- Survey **3 to 5 trees per species**.
- Where possible, survey an equal number of trees per species to allow for comparisons.
- Include both isolated trees and trees growing in groups or woodland, as pest communities may differ between these settings.
- Prioritise old or visible stressed trees as they may be more vulnerable.

Example: If the collection contains Fagus sylvatica and F. orientalis, survey 5 trees of each species, rather than 8 trees of one species and 2 of the other.



Visual Inspection

Carefully examine the following parts of each tree for signs and symptoms:

- **Leaves** - inspect both the upper and underside for discoloration, lesions, distortion, insect activity.
- **Bark** - check for scales, waxy deposits, cankers, cracks, bleeding, or other abnormalities.
- **Twigs and branches** - look for dieback, lesions, cankers.
- **Crown** - assess overall health, for signs of dieback.

Look for **symptoms of the target organisms**:

Beech Leaf Disease ([p. 8](#)), Petrakia ([p. 9](#)), Beech Scale ([p. 10](#)), Woolly Beech Aphid ([p. 11](#)).

You might encounter **symptoms caused by non-target organism**:

Refer to the look-alike symptoms ([p.12](#) and [p.13](#)).



Symptom classification

A. Target symptoms (Beech Leaf Disease, Petrakia, Beech Scale, Woody aphid)

- Take diagnostic photos (follow step 5)
- Record and submit data (follow step 6)
- Notify/contact coordinator (follow step 7)

B. Other / Unknown symptoms

- Take diagnostic photos (follow step 5)
- Record and submit data (follow step 6)

C. No symptoms observed

- Take basic reference photos (leaves + trunk)
- Record tree as asymptomatic

Survey Procedure: Step-by-step



Diagnostic Pictures

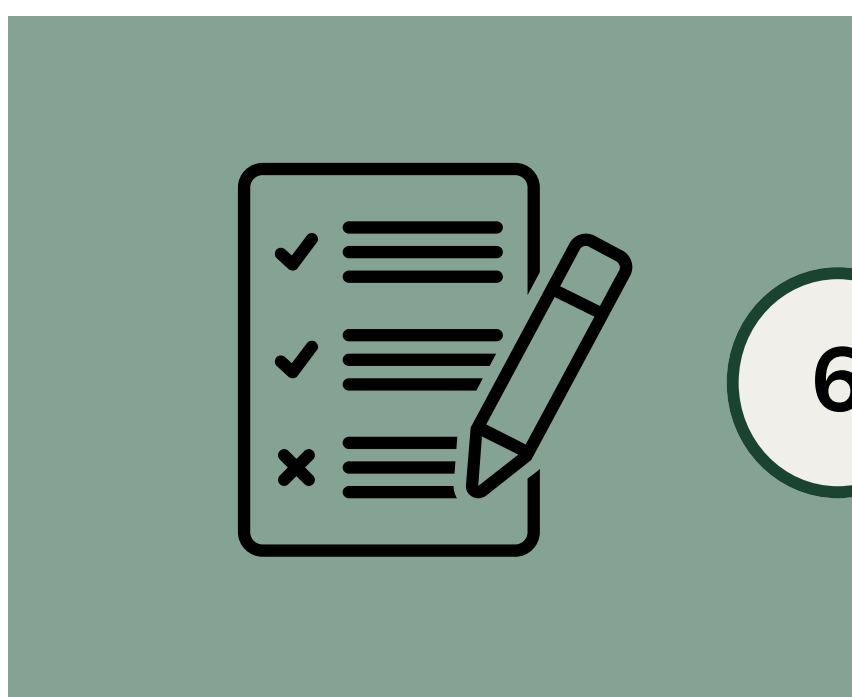
Use a smartphone or digital camera with good resolution to document symptoms and their context for accurate diagnosis, taking CLEAR photos of:

- **Close-up:** Symptoms on leaves, bark, twigs, or visible pests/diseases.
- **Affected area:** Whole branch, trunk section showing damage extension.
- **Whole tree:** General view to capture overall condition and context.

Tips for Effective Photos:

- Include a scale reference (e.g. ruler or coin) when possible
- Take multiple angles of the same symptom to aid diagnosis

Refer to the [IPSN Guide to Taking Photographs for Diagnostic Purposes](#) for more tips.



Data Recording

Record survey observations using one of the following options:

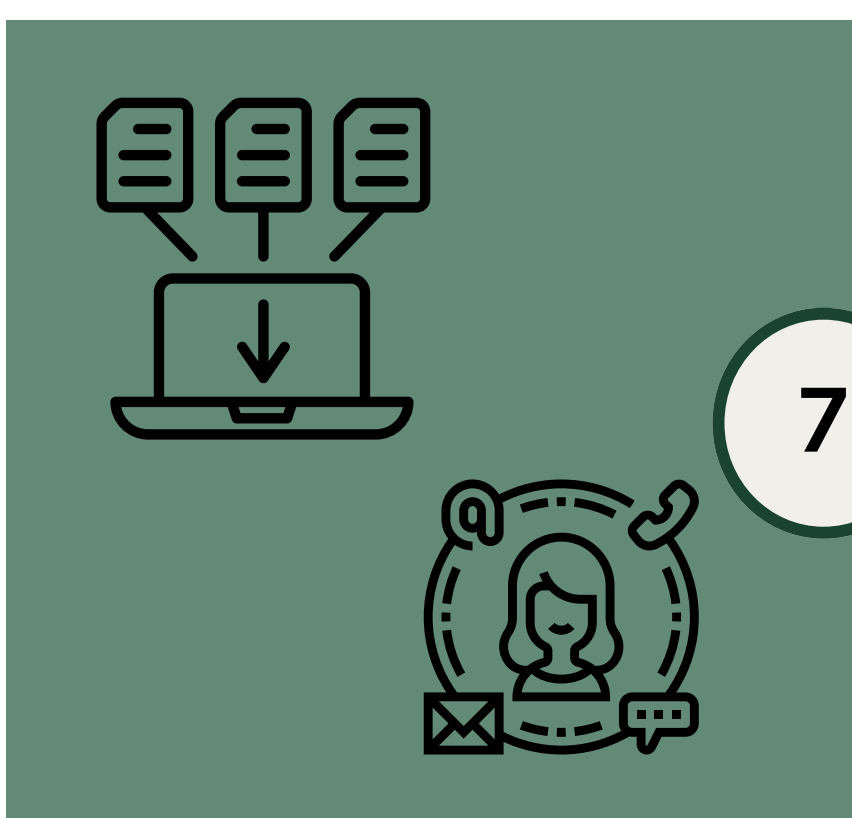
- **Survey forms (in p. 15)** you can also complete the form electronically using the [Excel version](#).
- Your **own reporting system** may be used, provided that it includes all required information listed below.

Access the Survey form:



For each tree surveyed, record:

- Date of survey.
- Tree ID and location (to be able to do any required follow-ups).
- General descriptions of the health of the tree
- Symptom observations (presence/absence and brief description)



Data submission & Reporting

All records:

Submit all survey results, including records of target and not target organism

- Upload the completed survey form + associated pictures the project folder:



Beech (*Fagus sp.*) monitoring - UK

- Create a folder named after your organisation and upload all of your survey results to that folder.

Reporting emerging threats:

If you suspect either of the target diseases that are not currently present in the UK (**Beech Leaf Disease** or **Petrakia leafspot**), in addition to submitting your records:

- Notify the Botanic Garden/Arboretum Plant Health Officer or plant health coordinator.
- Notify Plant Health authorities via [TreeAlert report](#).
 - Submit a General Report, including photos of the tree
 - Diagnosticians may seek to contact you for further information or to request that some samples are taken.



Submit a Report



General Report

Submit a report of a problem affecting the health of a tree. If you suspect or know the cause then please use the Disease specific report, otherwise use this General report.

Symptom Identification: Target disease

Beech Leaf Disease



Scientific name: The disease is associated with the foliar nematode *Litylenchus crenatae*.



Distribution: The disease was first reported on American beech in Ohio USA and is rapidly spreading through forest areas in Eastern USA and Canada [[see map](#)].



Host: American beech (*Fagus grandifolia*), European beech (*F. sylvatica*) and oriental beech (*F. orientalis*). The disease may also affect other *Fagus* species.



Impact: Beech leaf disease affects both native and ornamental beech species (*Fagus* spp.), posing a significant threat to forest ecosystems and urban beech populations. The nematode invades and damages developing leaf tissue, disrupting normal leaf development and reducing the tree's ability to photosynthesise. Over time, repeated infections lead to leaf deformation and loss of foliage, weakening trees and ultimately resulting in branch dieback and tree mortality.



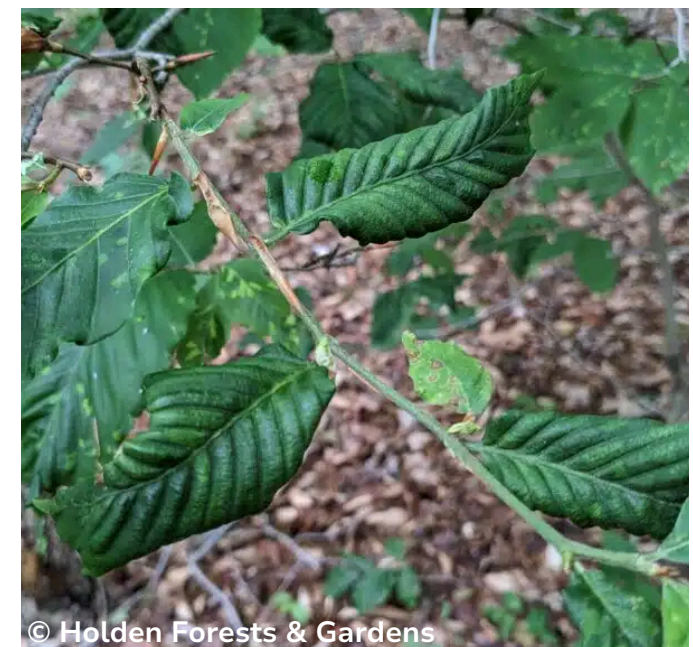
When to look for symptoms: During growing season. From early summer to early autumn.

Symptoms:

- Discoloration and thickening between the lateral veins creates distinctive dark green banding patterns. These bands are most visible when leaves are held up to sunlight or viewed from beneath the canopy.



- Affected tissue may develop chlorosis and necrosis.
- Banded areas often become leathery in texture and start to curl up.



- Leaves may become curled, deformed, shrivelled, and smaller than normal (Note that this is a non-specific symptom).



Symptom Identification: Target disease

Petrakia leafspot



Scientific name: The disease caused by the pathogenic fungus *Petrakia liobae*.



Distribution: Central Europe, including Switzerland, Germany, Austria, France, Slovakia and Slovenia. The origin of the species is unknown, it was thought to be originally from Japan, but research has shown that it is a different species from the closely related *Petrakia fagi*.



Host: European *Fagus* species: *F. sylvatica* and *F. orientalis*. Reported on hornbeam (*Carpinus betulus*) in heavily infested areas.



Impact: The disease is unlikely to result in the death of mature trees. However, it reduces tree health and visual appeal, especially of young beech trees.



When to look for symptoms: From early summer to autumn.

Symptoms:

- Brown irregular leaf spots with sharp, dark borders. These necrotic spots are around 1–50mm in diameter.



- The spots may merge in cases of heavy infection.



- From summer to autumn, mature leaf spots may also have tiny white fluffy spots of asexual spores, visible to the naked eye.



Symptom Identification: Target pest

Beech Scale



Scientific name: *Cryptococcus fagisuga*.



Distribution: Originally from the Caucasus Mountain region (southeastern Europe/western Asia); currently widespread in Europe, including the UK. It was introduced to North America, where it is invasive and continues to spread.



Host: Beech trees (*Fagus* spp.). Oriental beech (*F. orientalis*) is believed to be the ancestral host. The primary host in Europe is European beech (*F. sylvatica*), including its cultivars, and American beech (*F. grandifolia*) in North America.



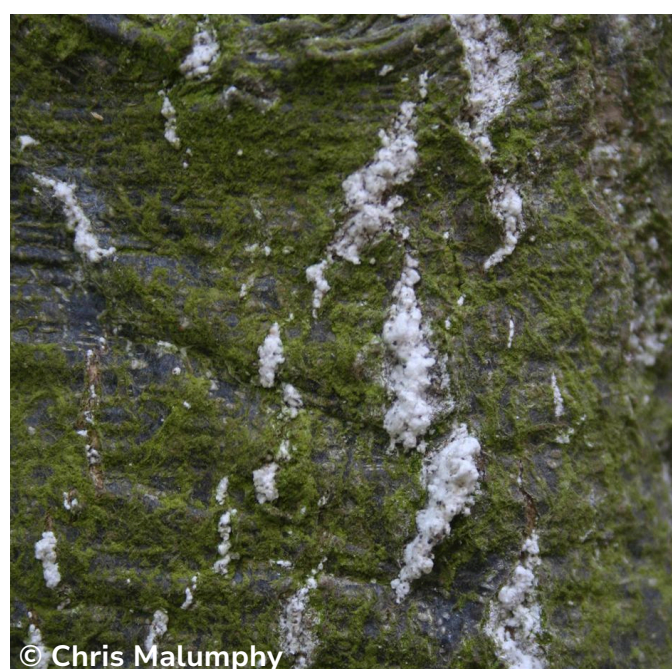
Impact: Heavy infestations can weaken beech trees by extracting nutrients and causing stress, but the main risk is their role in **beech bark disease**. Feeding by beech scale facilitates the infection of fungi (*Neonectria* sp.), which infect the bark. This leads to cankers, crown decline, reduced growth, and sometimes tree death.



When to look for symptoms: The scales can be detected all year but they are more conspicuous in July and August as the scales produce more wax.

Symptoms:

- Conspicuous patches of wool-like white wax are visible in bark crevices and rough areas, protecting the tiny, oval, pale-yellow adult scale insects beneath.
- As populations increase, the waxy covering can expand until it completely covers sections of the main stem.



- When feeding wounds are infected by the fungus *Neonectria* spp., cankers develop as the inner tissue is killed.



- Cankers may exude a red-brown liquid.



- In late stages of fungal infection, red-orange fungal fruiting bodies develop on older lesions.



Symptom Identification: Target pest

Woolly Beech Aphid



Scientific name: *Phyllaphis fagi*.



Distribution: Widespread throughout Europe, ranging from the Mediterranean to the UK and east to Turkey and the Caucasus. It also been introduced to North America, New Zealand, Australia, Asia (China and Korea) and the Middle East.



Host: Beech trees (*Fagus* spp.). Primary host is European beech (*F. sylvatica*) and its cultivars. It has also been reported in Oriental Beech (*F. orientalis*) and Japanese Beech (*F. crenata*).



Impact: Conspicuous in large numbers, cause leaf distortions and honeydew that can lead to sooty mould. However, established trees rarely suffer significant damage. Where possible, populations should be tolerated and natural predators encouraged. Natural enemies often reduce aphid numbers later in the season without intervention.



When to look for symptoms: from April, as soon as new leaves appear, to October.

Symptoms:

- Wingless aphids are pale yellow-green, elongated and up to 2 mm long.
- Winged forms have a dark head and thorax.



- Colonies of sap-feeding aphids appear as white, woolly patches on the underside of leaves in late spring and early summer due to the wax they secrete



- Feeding might cause the leaf margins to curl downwards, forming a characteristic pseudo-gall.
- Sticky honey secreted by aphids can be observed on the upper leaf surface and support the growth of black sooty mould..



Look alike:

During surveys, you are likely to encounter other pests, some of which may be confused with the target organism. If you are unsure whether the symptoms observed are caused by the target organism, complete the form and submit photographs so that our diagnosticians can assess the symptoms and provide a diagnosis.

We also recommend recording non-target organisms whenever possible. These records help improve our understanding of the overall pest situation in the gardens and contribute to mapping the distribution of other pest species.

Find here other beech pests, such as galls and sap-feeding insects:

- **Beech Gall Midge (*Mikiola fagi*):**

A tiny midge whose larvae induce smooth, barrel-shaped galls on the upper surface of the leaves. Galls are usually green at first and may turn red or brown with time.



- **Hairy Beech Gall Midge (*Hartigiola annulipes*):**

This small midge produces distinctive hairy or fuzzy galls on the leaf surface. As they develop, the galls become cylindrical, columnar, measuring approximately 4–6 mm in length.



- **Beech mealybug (*Trionymus newsteadii*):**

A sap-feeding insect covered with a white, waxy coating. Individuals are found on twigs, shoots or the undersides of leaves. They lack the dense woolly masses produced by woolly beech aphids.



- **Woolly or Cottony scales (*Pulvinaria* spp.):**

There are a couple of *Pulvinaria* species that produce white waxy ovisacs on the lower surface of the foliage and/or on the bark. Their ovisacs are much larger than the waxy deposits left by woolly beech aphid or beech scale.



Looks alike:

Find here other beech leaf symptoms, that can often be confused with Beech leaf disease or Petrakia leafspot

- **Blotch mines**

Usually caused by the larvae of the beech leaf blotch miner (*Phyllonorycter maestingella*). Larvae feed within the leaf tissue, producing pale to brown blotch mines, typically between the veins. The damage differs on the lower and upper surface



- **Beech Erineum Mites (*Aceria nervisequa*)**

Tiny eriophyid mites that induce patches of dense, felt-like hairs (erinea) on beech leaves. These occur on both leaf surfaces. On the underside, they form white, velvety patches between the veins, which may later turn pink. On the upper surface, similar white or pale velvety patches develop along the veins rather than between them.



- **Anthracnose**

A fungal disease that causes irregular brown to black lesions, often beginning at the leaf margins or along the veins. Severe infections may lead to leaf browning and drop. Unlike Petrakia leaf spot, anthracnose lesions are typically irregular and vein-associated.



- **Natural leaf senescence:**

In autumn, as leaves age, beech foliage naturally changes colour from green to yellow, orange or brown before leaf fall. During this period, leaf symptoms caused by pests and diseases may be more difficult to detect or distinguish from normal seasonal changes.



Appendix: Other information support resources

Target Organism Posters:



IPSN
International Plant
Sentinel Network



BOTANIC
GARDENS
INTERNATIONAL



Fera



For more information on the described organism, scan or click on the QR code to access the accompanying factsheets.

Beech (*Fagus* spp.) diseases

Beech (*Fagus* spp.) are long-lived trees and can grow up to 40m when mature. Their oval leaves have gently toothed or wavy edges. In spring, beech trees produce both male catkins and small female flowers, followed by the fruit known as a beechnuts/mast that drop from the tree in autumn.

In autumn, the foliage turns shades of yellow, orange, copper, and brown. Beech are marcescent trees, meaning they often retain their dry brown leaves throughout winter.

The following emerging diseases are known to afflict beech trees.

Beech Leaf Disease (BLD)

Background

The disease was first reported on American beech in Ohio USA and is rapidly spreading through forest areas in Eastern USA and Canada ([see map](#)). It affects multiple beech species, including American beech, European beech, and Asian beech species.

Beech leaf disease (BLD) is associated with the nematode *Litylenchus creatoreae*, native to Japan.

Symptoms are visible on green foliage during the growing season and become harder to distinguish in autumn due to natural senescence. Lower branches are often more severely affected than the upper canopy. Do not confuse with symptoms caused by leaf miners and mitis.

Symptoms

- Discoloration and thickening between the lateral veins creates distinctive dark green banding patterns (Fig. 1). These bands are most visible when leaves are held up to sunlight or viewed from beneath the canopy.
- Affected tissue may develop chlorosis and necrosis, and the banded areas often become leathery in texture (Fig. 2).
- Leaves may become curled, deformed, shrivelled, and smaller than normal (Fig. 3).
- In advance stages, buds may fail to develop, leaf production decreases, and premature leaf drop can lead to canopy thinning.

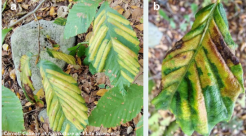


Fig 1. Dark-green striped bands between lateral veins of leaves. Fig 2. Distinctive banding with a, b) Chlorosis and necrosis of leaves, and b) leathery appearance. Fig 3. Leaves affected by beech leaf disease, showing a curled, shrivelled appearance and reduced size.

Petrakia leafspot (*Petrakia liobae*)

Background

Petrakia liobae is an emerging fungal pathogen threatening European beech species. It has also been reported on hornbeam (*Carpinus betulus*) in heavily infested areas. Thought to be a European species and not introduced, it was first discovered in Switzerland in 2008, followed by findings in Germany, Austria, Slovakia and Slovenia ([see map](#)).

The disease is unlikely to cause the death of mature trees. However, it reduces tree health and visual appeal, specially in young trees. Look for symptoms in the lower canopy as the *Petrakia* overwinters in leaf litter and re-infects nearby beech trees in the spring.

Symptoms

- Brown irregular leaf spots with sharp, dark borders. These necrotic spots are around 1–50mm in diameter (Fig. 1 a) and may merge in cases of heavy infection (Fig. 1 b,c).
- From summer to autumn, mature leaf spots may also have tiny white fluffy spots of asexual spores (Fig. 2), visible to the naked eye.



Fig 1. Beech leaves with irregular necrotic spots, with sharp, dark border. a) Small lesions ranging from 1–50 mm in diameter. b, c) larger, merged necrotic areas. Fig 2. White, asexual spores on a dark brown spot on the upper side of a leaf.

Latest edition: May 2026

Click here or scan the QR code to access **Beech disease poster:**



IPSN
International Plant
Sentinel Network



BOTANIC
GARDENS
INTERNATIONAL



Fera



For more information on the described organism, scan or click on the QR code to access the accompanying factsheets.

Beech (*Fagus* spp.) pests

Beech trees are important components of many temperate woodlands, with mature trees capable of reaching over 40 m in height. They are also widely valued as ornamental trees in park and gardens, with multiple cultivars developed for landscape use.

Beech trees produce both male catkins and small female flowers in spring. These develop into fruits known as beech nuts (or mast) that fall from the tree in autumn.

The following pests can commonly be found in beech trees in Europe and North America.

Beech Scale (*Cryptococcus fagisuga*)

Background

Beech scale is a tiny, wingless insect often found in colonies within bark crevices. Its distinctive white, waxy covering makes infestations highly visible. As a sap-sucking pest of beech trees (*Fagus* spp.), heavy infestations can weaken trees, but the greatest impact comes from beech bark disease. This disease results from feeding damage by the insect combined with fungal pathogens (*Neonectria* spp.) entering through insect-created wounds, leading to dieback and, in severe cases, tree mortality.

It is widespread in Europe, and was introduced to North America, where it is invasive and continues to spread.

Symptoms

- Conspicuous patches of wool-like white wax are visible in bark crevices and rough areas (Fig. 1a,b), protecting the tiny, oval, pale-yellow adult scale insects beneath (Fig. 1c).
- As populations increase, the waxy covering can expand until it completely covers sections of the main stem (Fig. 2).
- When feeding wounds are infected by the fungus *Neonectria* spp., cankers develop as the inner tissue is killed (Fig. 3a,b). Cankers may exude a red-brown liquid (Fig. 3c). In late stages of infection, red-orange fungal fruiting bodies develop on older lesions (Fig. 4).

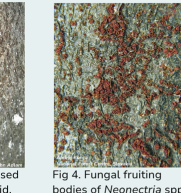


Fig 1. a,b) Colonies of bark scale in bark crevices. c) Beech scale adults covered on white wax. Fig 2. Beech trunk covered by white wax from scale insects. Fig 3. Cracks and cankers in beech trunk caused by beech bark disease. c) Canker exuding liquid. Fig 4. Fungal fruiting bodies of *Neonectria* spp.

Woolly Beech Aphid (*Phyllaphis fagi*)

Background

The woolly beech aphid is a sap-sucking insect feeding exclusively on foliage and young shoots of beech trees (*Fagus* spp.). Colonies produce distinctive white wax and sugary honeydew. Heavy infestations may cause leaf curling or distortion, but rarely cause significant damage.

The species is widespread throughout Europe and has been introduced to North America, Australia, New Zealand, parts of Asia, and the Middle East.

Symptoms

- Wingless aphids are pale yellow-green, elongated and up to 2 mm long (Fig. 1a). Winged forms have a dark head and thorax (Fig. 1b).
- Colonies of sap-feeding aphids appear as white, woolly patches on the underside of leaves in late spring and early summer due to the wax they secrete (Fig. 2).
- Feeding might cause the leaf margins to curl downwards, forming a characteristic pseudo-gall (Fig. 3).
- Sticky honey secreted by aphids can be observed on the upper leaf surface and support the growth of black sooty mould (Fig. 4).

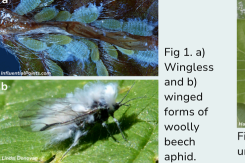


Fig 1. a) Wingless and b) winged forms of woolly beech aphid. Fig 2. White, woolly colonies of aphids underside beech leaves. Fig 3. Beech leaf margins curling downwards due to aphid feeding. Fig 4. Black sooty mould on the upper surface of beech leaf.

Latest edition: May 2026

Click here or scan the QR code to access **Beech pest poster:**

Target Organism Factsheets:



IPSN
International Plant
Sentinel Network



Fera



IPSN
International Plant
Sentinel Network



Fera



For more information on the described organism, scan or click on the QR code to access the accompanying factsheets.

Beech (*Fagus* spp.) diseases

Beech Leaf Disease (BLD)

Introduction

This disease affects native and ornamental beech (*Fagus* spp.) trees, and can kill beech trees of all ages, causing a big impact on forested areas.

The causative agent of beech leaf disease is *Litylenchus creatoreae*, a nematode species native to Japan.

First reported in Ohio in 2012, the disease rapidly spread into neighbouring area forest areas in Eastern USA and Canada ([see distribution map](#)).

The disease is primarily spread through movement of infested plant material in spread with feeding from birds and insects. Human-mediated transport, such clothing, and vehicles carrying plant debris or soil from infested areas, is also common.

Host

The disease was first reported on America beech (*Fagus grandifolia*), but it has also on *Fagus sylvatica* and oriental beech (*Fagus orientalis*). Additionally, Chinese beech to be a potential host. The disease may also affect other *Fagus* species.

Biology

BLD is caused by the foliar nematode *Litylenchus creatoreae*, which has been isolated leaves. However, in few cases, the nematode has also been found on asymptomatic.

Nematode populations increase in the leaves during the trees' growing season, summer and early autumn. After numbers have built up, nematodes migrate to the.

The nematodes spend the autumn and winter in the buds and can also overwinter in the bad tissue, causing tissue deformation that affects leaf expansion. In severe or repeated infections, trees may experience reduced canopy potential mortality, particularly in young or stressed individuals.

Symptoms

For details of the symptoms, scan or click on the QR code to access the accompanying factsheet.

More information

- Observations: https://www.observatree.org.uk/media/2694/22_0001_one-off-beech-leaf-disease_wj08.pdf
- EPPO Global Database: <https://gd.eppo.int/taxon/LITYMC>
- Forest Pathology: <https://doi.org/10.1111/efpa.12500>
- Penn State Extension: <https://extension.psu.edu/beech-leaf-disease>
- Cornell Integrated Pest Management: <https://icpm.cornell.edu/integrated-pest-education/fact-sheets/beech-leaf-disease>

Acknowledgements

This factsheet was written by Itxaso Quintana, BGCI, a reviewed by Charles Lane & Thomas Pt IPSN, June 2026.

Petrakia leafspot (*Petrakia liobae*)

Introduction

Petrakia is a pathogenic fungus (*Petrakia liobae*) that causes leaf spot disease on beech trees (*Fagus* spp.). The disease spread relatively slow and is unlikely to result in the death of mature trees. However, it reduces tree health and visual appeal, especially young beech trees.

The fungus was first discovered in Switzerland and Germany in 2008, and has subsequently been found in Austria, France, Slovakia and Slovenia. It was thought to be originally from Japan, but research has shown that it is a different species from the closely related *Petrakia fagi*, so the origin of the species remains unknown. It therefore remains unclear whether this is an overlooked native pathogen now becoming more apparent due to environmental change, or an introduced invasive species.

Dispersal is primarily through fungal spores, and potentially through the movement of infected plant material.

Host

It has been found on European *Fagus* species: *F. sylvatica* and *F. orientalis*.

It has also been reported on hornbeam (*Carpinus betulus*) in heavily infested areas.

Biology

Petrakia liobae is an ascomycete fungus with two reproductive phases: sexual and asexual.

The fungus can overwinter in infected leaf litter, and spread to nearby hosts during the following growing season.

In spring, dark, blackish-brown sexual fruiting bodies develop on fallen, infected leaves in the litter layer. Around April–May, coinciding with the emergence of new beech foliage, spores are released and dispersed by wind, leading to primary infections of young leaves, particularly in the lower canopy and on young beech trees.

Following infection, small brown lesions develop on the leaves. Later in the season (typically June–October), white asexual spore bodies are produced on these lesions. These asexual spores drive secondary infections within the same growing season.

The pathogen is polycyclic, meaning it can undergo multiple infection cycles within a single growing season, particularly under humid conditions that favour its spread.

Symptoms

For details of the symptoms, scan or click on the QR code to access the accompanying poster.

More information

- EPPO Global Database: *Petrakia liobae* (PTRLI) Overview | EPPO Global Database
- Gov.UK: <https://planthealthportal.defra.gov.uk/assets/factsheets/Pest-Alert-Petrakia-liobae.pdf>
- Wald Wissen: <https://www.waldwissen.net/en/forestry/forest-protection/invasive-species/petrakia-liobae-leaf-spot-of-common-beech>

Acknowledgements

This factsheet was written by Itxaso Quintana, BGCI, a reviewed by Charles Lane, FERA. Edited and produced by the IPSN, June 2026.

Click here or scan the QR code to access **Beech disease factsheet:**



IPSN
International Plant
Sentinel Network



Fera



IPSN
International Plant
Sentinel Network



Fera



For more information on the described organism, scan or click on the QR code to access the accompanying factsheets.

Beech (*Fagus* spp.) pests

Beech Scale (*Cryptococcus fagisuga*)

Introduction

Beech scale (*Cryptococcus fagisuga*) is a tiny, wingless, sap-sucking insect that feeds on the sap of beech trees (*Fagus* spp.). This insect is typically found in colonies within bark crevices on the trunk and larger branches. It secretes a distinctive white wax making infestations highly visible on affected trees.

Beech scale is an invasive pest in North America. It was accidentally introduced from Europe to Nova Scotia, Canada, around 1890 and was first discovered in 1920. The insect is currently widespread continues to spread in North America. Recent genetic studies suggest that the population is from the Caucasus Mountain region in western Asia-southeastern Europe, where the oriental beech scale is native.

While heavy infestations can weaken trees by extracting nutrients and causing threat posed by beech scale is its role in the development of beech bark disease. If interaction between beech scale and pathogenic fungi, primarily *Neonectria faginata* by the scale insect creates wounds in the bark that allow fungal spores to penetrate disease can cause bark cankers, crown decline, reduced growth, and ultimately tree mortality.

Host

Beech scale attacks beech trees (*Fagus* spp.). Oriental beech (*F. orientalis*) is believed to be a host in Europe is European beech (*F. sylvatica*), including its cultivars, while in North America beech (*F. grandifolia*).

Biology

The scale insect in microscopic (under 1 mm), oval-shaped and pale yellow. They white, woolly, wax (CMI) covering that protects themselves from desiccation.

The species reproduces parthenogenetically, meaning females can produce offspring without the need for males.

During early summer, each female lays clusters of up to 8 eggs beneath the protective wax. The eggs hatch in late summer, and the nymphs, known as "crawlers," disperse to new feeding sites being carried by wind. After settling in bark crevices on the trunk and larger branches and begin feeding. They overwinter as immature nymphs and complete spring, when they mature into adult females and begin the next generation. It develops on a tree in 2–3 years.

Symptoms

For details of the symptoms, scan or click on the QR code to access the accompanying factsheet.

More information

- RHS: <https://www.rhs.org.uk/biodiversity/beech-scale>
- Forest Pest Insects in North America: <https://www.forestpests.org/pdf/300.html>
- C State: <https://content.ces.ncsu.edu/beech-bark-disease>
- Forestry Commission Bulletin: <https://cdn.forestryresearch.gov.uk/2087/03/fcb>

Acknowledgements

This factsheet was written by Itxaso Quintana, BGCI, and reviewed by Chris Malumphy, FERA, June 2026.

Woolly Beech Aphid (*Phyllaphis fagi*)

Introduction

The woolly beech aphid (*Phyllaphis fagi*) is a sap-sucking insect that feeds on the leaves and young shoots of beech trees (*Fagus* spp.). The primary host is European beech (*F. sylvatica*) and its cultivars. It has also been reported in Oriental beech (*F. orientalis*) and Japanese beech (*F. crenata*).

Biology

The woolly beech aphid overwinters as eggs in beech buds and bark crevices laid in autumn. Eggs hatch in spring and for much of the spring and summer, colonies consist of wingless females that reproduce asexually, allowing populations to increase rapidly when conditions are favourable. During mid to late summer, winged forms are produced and disperse to colonise other beech trees.

A distinctive feature of this species is its white wax covering, which is secreted after each moult and may form long, filamentous strands on older aphids. The wax is believed to help protect them from honeydew contamination, predators, rain and moisture.

The honeydew that they produce attracts ants that may tend and protect aphid colonies.

Symptoms

For details of the symptoms, scan or click on the QR code to access the accompanying poster.

More information

- RHS: <https://www.rhs.org.uk/biodiversity/woolly-beech-aphid>
- Influential Points: https://influentialpoints.com/Gallery/Phyllaphis_fagi_Woolly_beech_aphid.htm

Acknowledgements

This factsheet was written by Itxaso Quintana, BGCI, and reviewed by Chris Malumphy, FERA. Edited and produced by the IPSN, June 2026.

Click here or scan the QR code to access **Beech pest factsheet:**

14

Appendix: Survey form

Download the
Excel version [here](#):



IPSN
International Plant
Sentinel Network

SURVEY DETAILS			
Name of Botanic Garden / Arboretum:			
Country:			
Address:			
Survey carried out by:			
Date of survey:			
Best description of season:			
TREE DETAILS			
Species (Cultivar):			
Accession number:			
Location (GPS if available):			
Country/region the species is native to:			
Age (years):			
GENERAL DESCRIPTION OF HEALTH			
Generally healthy		Some damage	
Dying		Dead	
SYMPTOMS CHECK			
Are there any symptoms corresponding to the target pests and diseases present? (Please mark accordindly)			
<u>Beech Leaf Disease*</u>		<u>Beech Scale and/or Beech Bark Disease</u>	
Leaf discoloration: Green banding pattern.		Conspicuous patches of wool-like white wax in bark crevices and rough areas	
Interveinal chlorosos and/or necrosis.		Waxy covering completely covering sections of the main stem.	
Leathery, curled, deformed, shrivelled, and/or reduced leaf size.		Cankers visible on the trunk and/or exudation of red-brown liquid.	
Premature leaf drop, aborted buds, thining canopy.		Red-orange fungal fruiting bodies in the trunk.	
<u>Petrakia leafspot*</u>		<u>Woolly Beech Aphid</u>	
Brown irregular leaf spots with sharp, dark borders (1-50mm diameter)		White, woolly patches of aphid colonies on the underside of leaves	
Merged necrotic spots		Curled leaf marging, forming a pseudo-gall	
Lesions presenting white spots of fluffy spores		Sticky honeydew on the upper leaf surface, supporting the growth of black sooty mould.	
<u>*If Beech Leaf Disease of Petrakia Leafspot are suspected, submit a TreeAlert report.</u>			
Describe the observed target symptoms:			
Describe any other non-target symptoms observed:			



IPSN
International Plant
Sentinel Network



**BOTANIC
GARDENS**
CONSERVATION
INTERNATIONAL

Thank you for your participation!

For any questions, please contact:

International Plant Sentinel Network (IPSN):

lara.salido@bgci.org
itxaso.quintana@bgci.org