

Hawthorn

(*Crataegus* spp.)

Sampling Protocol



IPSN
International Plant
Sentinel Network



**BOTANIC
GARDENS**
CONSERVATION
INTERNATIONAL



Forest Research



Fera

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Project background



Why do we need your support?

Hawthorn is the backbone of UK hedgerows, making up around 70% of their structure. These hedgerows are vital for biodiversity, habitat connectivity and carbon storage, and therefore important for meeting environmental targets. However, despite its importance, its resilience to pests, diseases, and climate change remains poorly understood.

More research is required to understand how hawthorn vulnerability poses wider risks to the treescape. For example, hawthorn is a host species for the Fireblight pathogen that can then be passed on to apple and pear orchards.

That's where you come in!

By sharing samples of hawthorn showing possible signs of disease, you will be helping researchers:

- Build a clearer picture of current and emerging threats to hawthorns
- Contribute with crucial evidence that supports better tree health surveillance
- Strengthen hedgerow resilience
- Contribute to national environmental goals

Every sample makes a real difference.



Who can take part?

We welcome sample contributions from **anyone with an interest in nature, trees, or the environment.**

You can take part if you are: **Over 18** (or accompanied by a responsible adult).

You do not need to be a specialist or professional.

Whether you are a land manager, gardener, volunteer, student, naturalist, or someone who enjoys noticing what is happening in green spaces, your involvement can make a real difference.



When can you take part?

Sampling should take place between **1st April to 30th September 2026.**

2026 APRIL						
SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

2026 MAY						
SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

2026 JUNE						
SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

2026 JULY						
SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

2026 AUGUST						
SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

2026 SEPTEMBER						
SUN	MON	TUE	WED	THU	FRI	SAT
						1
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			



Who is undertaking this research?

Forest Research, **Fera**, **The Tree Council**, and the **International Plant Sentinel Network** (a technical initiative of Botanic Gardens Conservation International) are collaborating on a two-year project funded by the Department for Environment, Food and Rural Affairs (DEFRA), to investigate the resilience of hawthorn in the UK, with a particular emphasis on hedgerows.



Participation Information



Safe and Responsible Sampling

Please ensure all sampling is carried out safely and responsibly, **respecting people, wildlife, and land**, following the **Countryside Code**.

When taking samples, do so carefully by:

- Only collecting what you need to send for testing
- Avoiding causing unnecessary damage to plants, habitats, or surrounding areas
- Being mindful of the area you are collecting in

And, if collecting on private land, **seeking permission from the landowner**



Data protection and Dissemination

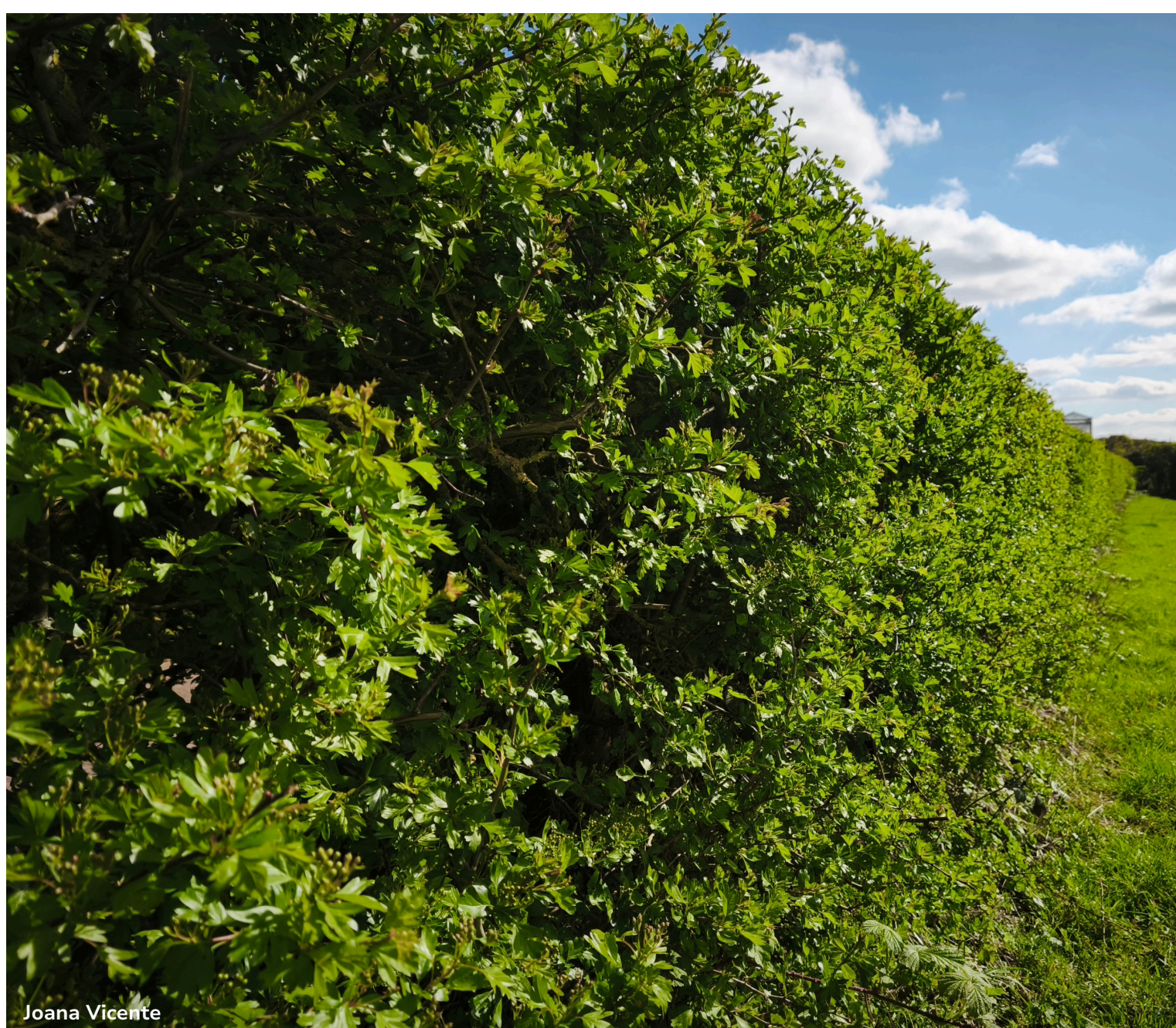
- By sending in photographs by email and samples by post, you are consenting that you are happy for these to be used for research and dissemination purposes.
- When sharing photographs and samples of hawthorns, you will be asked for your name, email address, and location information linked to the hawthorn in the sampling sheet provided (page 15). Your address is required if you ask the project to pay for postage.
- By providing your name and email address, you agree that a researcher will contact you to thank you for your contribution and to share the test results from your sample and the wider project.
- All **personal data will stay private**. It will not be shared outside the project or used for any other purpose. It will be:
 - Stored securely
 - Accessed only by authorised members of the research team
 - Handled in line with data protection requirements



Questions?

For more information or if you have any questions, please do not hesitate to contact us. One of our team members will get back to you as soon as possible.

✉ hawthorn.sampling@forestresearch.gov.uk



Hawthorn: An Overview

Hawthorn is primarily represented by two native species: **common hawthorn** (*Crataegus monogyna*) and **midland hawthorn** (*Crataegus laevigata*). Both are small deciduous trees or large shrubs native to the UK and much of Europe. There are also cultivated forms of hawthorn in urban settings.

Importance

In Britain, hawthorns have long been a key species in traditional hedgerows, forming the backbone of many rural field boundaries. Their tough, thorny growth makes them ideal for hedge laying, creating dense, stock-proof barriers that are highly effective for containing livestock. Hawthorn hedges also help prevent soil erosion and serve as natural windbreaks.



Hawthorns also play a vital role in supporting biodiversity. Their dense, thorny branches provide safe nesting sites for many bird species. In spring, the flowers offer nectar and pollen for bees and other pollinators, while in autumn, the bright red fruits are a rich food source for birds and small mammals.

Beyond their ecological importance, hawthorns also hold cultural and medicinal significance. They have been used for centuries in traditional herbal medicine, often associated with heart health, and feature prominently in British folklore and rural heritage.

Identification & Characteristics

Hawthorns typically grow as dense, thorny shrubs, though they can also develop into small trees up to 15 m tall with a single stem. Their branches are often armed with sharp, woody thorns.

LEAVES:

Their leaves are around 6 cm long.

FLOWERS:

In late spring, around May, hawthorns produce abundant clusters of five-petaled flowers, usually white, though sometimes appear pale pink.

**Stigma is the receptive tip of the female reproductive organ, found in the centre of a flower, designed to catch and trap pollen.*

FRUITS:

By autumn, the flowers mature into bright red berries known as haws.

COMMON HAWTHORN



Deeply lobed, toothed leaves.



Flowers have a single stigma*.



Berries contain a single seed.

MIDLAND HAWTHORN



Shallower lobes on leaves.



Flowers have two stigmas*.



Berries usually contain two seeds.

How to Get Involved ?

You can get involved by sampling hawthorn plants where you live, work, or visit. It does not have to be a special trip and can fit into your daily routine or weekend walks.

What to look for

We would like you to look out for:

- **Hawthorns showing suspected symptoms (symptomatic) of two diseases:** Fireblight and Rusts.
- **Hawthorns with no particular symptoms (asymptomatic):** We are also interested to know about these, but we will only need you to complete a sampling sheet, with an optional photograph. **No sample will be needed.**

If you are unsure whether what you have found is significant, please still send a sample or, if you prefer, send us a photo and location before collecting a sample.

You can follow the flow diagram in the next page to understand the required next steps according to which kind of hawthorn you are observing. However, before you go out sampling, ensure you check the following material checklist:



What you will need

- **Sampling sheet(s)** ([Online form](#) OR pp. 15)
- **A smartphone**
 - to take photographs (*alternatively use a digital camera*)
 - and record a what3words location or 8-figure grid reference (*alternatively use a GPS device*)
- **Secateurs or garden scissors**
- **Disinfectant** (e.g. alcohol wipes or gel) for cleaning tools and hands
- **Plastic bag AND paper envelopes** for storing samples
- **A waste bag** for any rubbish
- **A marker/ pen** for labelling samples
- **Package/Envelope** for sending samples (*only needed when preparing samples to be posted*)

Collector name:	
Collector email:	
Date of collection (DD/MM/YYYY):	
Species:	<input type="checkbox"/> Common Hawthorn <input type="checkbox"/> British Hawthorn <input type="checkbox"/> Spotted Hawthorn and related <input type="checkbox"/> Crataegus (non-prunus species) <input type="checkbox"/> Suspected Fireblight <input type="checkbox"/> Suspected Rust <input type="checkbox"/> Asymptomatic (no sample sent)
If symptomatic: observed symptoms and brief description of photograph/sample	
If asymptomatic: brief description of photograph	
Site name:	
County:	
Postcode:	
8 figure grid reference for exact location	
Tree context: • Isolated tree, hedgerow, proximity to other trees • Landmarks nearby (this might help you find the hawthorn if you can't return in one month)	

Scan to access the Online form:



Flow diagram



Going for a walk looking out for Hawthorns

Don't forget to take the materials outlined in the previous page !



You see a hawthorn



The hawthorn is symptomatic, it is displaying symptoms of Fireblight (Page 8) or Rust (Page 9)



The hawthorn is asymptomatic (no symptoms are displayed)



'Please note, you do not need to report these suspected symptoms via [TreeAlert](#).

If you see any other tree pests and diseases, please do report these via the online reporting tool.'

If Fireblight....

If Rust....

Follow the protocol on [Page 11](#) for collecting Fireblight samples

Follow the protocol on [Page 12](#) for collecting Rust samples

Follow the protocol on [Page 10](#) for Asymptomatic Hawthorns*

Follow protocol on [Page 13](#) to package and send the samples*

*We will send you feedback on your submitted photographs and samples



Return in every month if you can, and complete the flowchart again

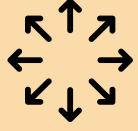
Symptom identification: Fireblight



Name and type of disease: Fireblight is a bacterial disease, its scientific name is *Erwinia amylovora*.



Known distribution: Western Europe (including the UK), North America, most of the countries around the Mediterranean sea, and New Zealand [See map].



How does the disease spread? Pruning tools, rain, wind, insects and birds.



When to look for symptoms: April to September.



Symptoms:

- **Brown to black necrotic or burned appearance** of leaves, flowers and fruits (i.e. wilting), but remain attached to the plant.

**Note: Check that wilting is not occurring due to stalk being broken or snapped.*



OSU Plant Clinic Collection



Erwinia amylovora (ERWIAM) - <https://gd.eppol.it>

- **Shoot tips wilt and bend over, forming a hook or "shepherd's crook" shape.**



Chiara Delvago (Italy)

Shepherd's crook

- When the bark is peeled back, the outer wood and cambium shows a **foxy reddish-brown colour**.



Erwinia amylovora (ERWIAM) - <https://gd.eppol.it>

- Sometimes **exudates** might appear on the branches.



Exudates

Phil Hamm

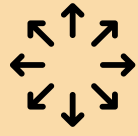
Symptom identification: Rust



Name and type of disease: Rust is a fungal disease. The scientific name for the fungus on hawthorn is *Gymnosporangium*, with species such as *G. clavariiforme* and *G. confusum* being found in the UK.



Known distribution: Present in the UK.



How does the disease spread? Requires two host plants to complete its life cycle in a growing season: junipers produce the spores that infect hawthorn and other species, including fruit trees. Spores are spread by the wind, and disease development depends on environmental conditions and host proximity.



When to look for symptoms: From approximately May on leaves and stems to the end of September for fruit as well. Fruit infections give plenty of spores, so we particularly welcome these.



Symptoms:

- Bright orange-yellow spots on the upper surface of leaves, sometimes with a brown or black dot at the centre.



Erik Agar, Shutterstock, Gardenia.net

- Red swollen spots on the leaf.



David Gould, naturespot.org

- Small, soft, cream/pale brown, hair-like structures grow from swollen areas of leaves, stems, shoots and fruits, petioles, and shoots.



David Nicholls, naturespot.org



David Gould, naturespot.org



David Nicholls, naturespot.org

- These hair-like structures form around the aecia (the spore producing bodies). When touched, they readily release fine, brown, powdery spores that are easily dislodged.



Debbie Frederickson-Matika

Close-up of the *aecia* with hair-like structures, releasing the powdery rust spores.

Aecia (spore producing body)

Spores

- Swellings or galls on the leaves or stems with the soft, hair-like fingers.

***Note:** these are not to be confused with insect galls that would not have the protruding 'hairs'.



David Gould, naturespot.org

How to record & submit Asymptomatic Hawthorns

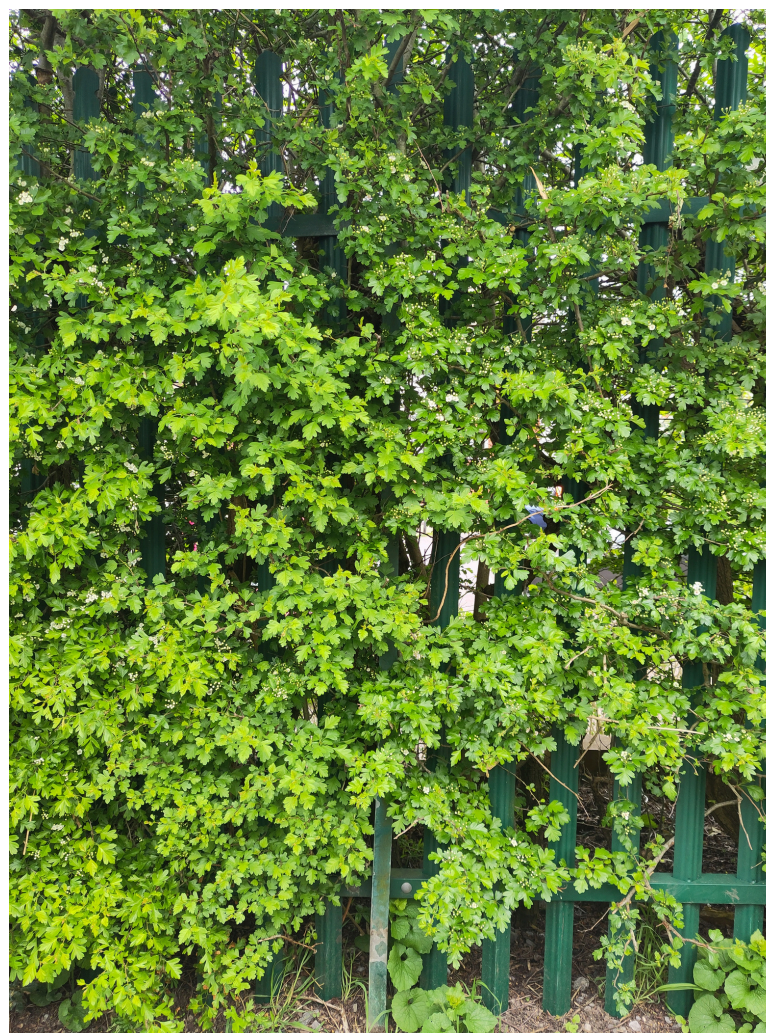
If a hawthorn is showing none of the signs or symptoms described for Fireblight (Page 8) or Rust (Page 9).



Whilst you are out and find a hawthorn:

- 1** Fill out the 'sampling sheet' ([online form](#) OR in pp. 15). Record:
 - Your name and email
 - Date of observation
 - Hawthorn species
 - Description of the photo (if taken)
 - GPS location of the sample (8 figure grid reference or what.3.words)
 - [More information in FAQ](#)
 - Tree context
- 2** Take photographs of:
 - The hedgerow tree in context/habitat (optional)

Example photographs of the asymptomatic hawthorn in its context
(photo by: Laura Baker)



Collector name:	
Collector email:	
Date of collection (DD/MM/YY):	
Species	<input type="checkbox"/> Common Hawthorn <input type="checkbox"/> Midland Hawthorn <input type="checkbox"/> Hawthorn (unsure what species) <input type="checkbox"/> Orchard tree, please specify:
Plant Number <small>If you are sampling from different plants call them 1, 2, 3 etc.</small>	
If asymptomatic: Observed symptoms and brief description of photograph/sample <small>Example (asymptomatic): 1a- Fruits have fingers and brown dust 1b- Leaves have galls with fingers</small>	<input type="checkbox"/> Suspected Fireblight <input type="checkbox"/> Suspected Rust <input type="checkbox"/> Asymptomatic (email only) Brief description:
If asymptomatic: Brief description of photograph <small>Example: Hawthorn as part of a hedgerow following a walking path</small>	
Location of the sample (provide as many as you can)	Site name County Postcode 8 figure grid reference or what.3.words
Tree context: • Isolated tree, hedgerow, proximity to orchard • Landmarks nearby (this might help you find the hawthorn if you can return in one month) <small>Examples: • Tree in hedgerow next to allotment • On Motor road, close electricity pylons down from the turning to Church lane</small>	



When you get back home:

- 3** Label your photographs:
 - Species (if known) & Date
 - Name them as asymptomatic
- 4** Upload and submit your photographs:
 - Attach your photographs to the [online form](#).
 - Alternatively, email an image of your 'sampling sheet' and any photographs you took.
[✉ hawthorn.sampling@forestryresearch.gov.uk](mailto:hawthorn.sampling@forestryresearch.gov.uk) Subject line: 'Hawthorns: Asymptomatic'



Return (if you can) monthly.
Look for signs of Fireblight and Rust or if it is asymptomatic.

How to record suspected Fireblight

Collect from up to 3 individual trees in an area. Collect additional samples from at least 3-5 km away.



Whilst you are out and find a hawthorn:

1 Fill out the 'sampling sheet' ([online form](#) OR in pp. 15). Fill in one sheet for each tree. Record:

- Your name and email
- Date of observation
- Species
- Plant number (if you are sampling multiple plants number them 1,2,3, etc...)
- Observed symptoms
- GPS location of the sample (8 figure grid reference or what.3.words)
 - [More information in FAQ](#)
- Tree context

Collector name:	
Collector email:	
Date of collection (DD/MM/YY):	
Species:	<input type="checkbox"/> Common Hawthorn <input type="checkbox"/> Midland Hawthorn <input type="checkbox"/> Hawthorn (ensure what species) <input type="checkbox"/> Orchard tree, please specify:
Plant Number:	
If symptomatic: Observed symptoms and brief description of photograph/sample	<input type="checkbox"/> Suspected Fireblight <input type="checkbox"/> Suspected Rust <input type="checkbox"/> Asymptomatic (seal only) Brief description:
If asymptomatic: Brief description of photograph	
Site name:	
County:	
Postcode:	
8 figure grid reference or what.3.words:	
Tree context:	

2 Take photographs of:

- The hedgerow tree in context/habitat
- The symptom in context within the tree (e.g. on the branch)
- The symptom in detail and as sampled

Example photographs. A) tree in context, B) symptom in context, C) the symptom in detail.
(photos by: Chiara Delvago (Italy))



3 Collect symptomatic samples:

- Cut a shoot approximately 20 cm long.
- Include both symptomatic and healthy living tissue around the suspected lesion edges (the boundary between diseased and healthy tissue).
- Ensure there is plenty of healthy material sampled, as infection can continue to travel down the stem after cutting.

4 Package the sample:

- Place the shoot into a plastic bag and seal it.
- If you are sampling from multiple plants, place them in separate bags.
- Label the bags:
 - Plant number: 1, 2, 3... (if sampling from multiple plants)
 - Species (if known) & Date of collection
 - Suspected Fireblight



Disinfect your cutting tools and hands after handling samples, especially between trees, to prevent the spread of pathogens. Use antibacterial gel or wipes.



Collect only what is needed. If excess material is cut, leave it beneath the tree or dispose of it with domestic waste at home.



IMPORTANT! In cases where diseased hawthorn is close to **orchards**, and you have permission to access and sample, please also **look at pear and apple trees** close by to see if they have any Fireblight symptoms. Please email us photographs and post samples in the same way.



Return (if you can) monthly.

Look for signs of Fireblight and Rust or if it is asymptomatic.

How to record suspected Rust

Collect from up to 3 individual trees in an area. Collect additional samples from at least 3-5 km away.



Whilst you are out and find a hawthorn:

1 Fill out the 'sampling sheet' ([online form](#) OR in pp. 15). Fill in one sheet for each tree. Record:

- Your name and email
- Date of observation
- Species
- Plant number (if you are sampling multiple plants number them 1,2,3, etc...)
- Observed symptoms
- GPS location of the sample (8 figure grid reference or what.3.words)
 - [More information in FAQ](#)
- Tree context

Collector name:		
Collector email:		
Date of collection (DD/MM/YY):		
Species:		<input type="checkbox"/> Common Hawthorn <input type="checkbox"/> Midland Hawthorn <input type="checkbox"/> Hawthorn (unsure what species) <input type="checkbox"/> Orchard tree, please specify:
Plant Number:		
If symptomatic: Observed symptoms and brief description of photograph/sample (a) - Photo show right and down view (b) - Closest view galls with figures		<input type="checkbox"/> Suspected Fireblight <input type="checkbox"/> Suspected Rust <input type="checkbox"/> Asymptomatic (seal only) Brief description:
If asymptomatic: Brief description of photograph (a) - Hawthorn as part of a hedgerow following a country path		
Site name:		
County:		
Postcode:		
8 figure grid reference or what.3.words:		
Tree context: • Isolated tree, hedgerow, proximity to orchard • Landmarks nearby (this might help you find the hawthorn if you can return in one month)		
Dangers: • Tree is hedgerow next to allotment • On Motor road, three electricity pylons about 10m from the hawthorn to the right.		

2 Take photographs of:

- The hedgerow tree in context/habitat
- The symptom in context within the tree (e.g. on the branch)
- The symptom in detail and as sampled

Note: for leaves, please share image of the upper and underside

Example photographs. A) tree in context, B) symptom in context, C) the symptom in detail.
(photos by: Debbie Frederickson Matika)



3 Collect symptomatic samples:

- For each symptomatic Hawthorn, please collect a **minimum of 6** of the following, if you can (more if possible):
 - Fruits, including the stalk
 - Leaves, including the leaf stalk
 - Short pieces of twigs with galls

4 Package the sample:

- Place the fruits, leaves, twigs with galls into separate paper bag or envelopes, and seal them. **IMPORTANT! use paper** first to conserve the spores. Then place the paper bags inside a plastic bag for extra protection.
- If you are sampling from multiple plants, place each plant's samples in separate bags.
- Label each bag:
 - Plant number: 1, 2, 3... (if sampling from multiple plants)
 - Sample type code: a, b, c (for different types: fruits, leaves, twigs)
 Example: Plant 1 → 1a(fruits), 1b(leaves); Plant 2 → 2a(fruits), 2b(leaves), 2c(twigs)
 - Species (if known) & Date of collection
 - Suspected Rust



Disinfect your cutting tools and hands after handling samples, especially between trees, to prevent the spread of pathogens. Use antibacterial gel or wipes.



Collect only what is needed. If excess material is cut, leave it beneath the tree or dispose of it with domestic waste at home.



Return (if you can) monthly.

Look for signs of Fireblight and Rust or if it is asymptomatic.

How to package & send samples



When you get back home:

1

Label your photographs:

- Species (if known) & Date
- Name photos accordingly to Fireblight or Rust, depending on the suspected symptoms
- If you have sampled from different plants, name the photos differently with their Plant Number (i.e., 1,2,3,etc..)

2

Upload and submit your photographs

- Attach your photographs to the [online form](#).
- Alternatively, **email** an image of your 'sampling sheet' and any photographs you took
 - ✉ hawthorn.sampling@forestresearch.gov.uk. Subject line: **'Hawthorns: Suspected Fireblight'**
 - ✉ hawthorn.sampling@forestresearch.gov.uk. Subject line: **'Hawthorns: Suspected Rust'**

3

Prepare samples for posting

- Ensure samples are dry to prevent rotting. If wet, blot it with clean tissues (use a different one for each sample).
- If thorns might pierce packaging, please remove thorns with your secateurs / garden scissors.

***For rust samples:** Wrap the sample in clean paper, securing the ends firmly. Place it in a clean, dry paper envelope and seal it. **IMPORTANT! Use paper** to help conserve the spores.

- Place samples in bags, and make sure they are correctly labelled (for Fireblight) and (for Rust):
 - Species (if known) & Date of collection
 - For multiple plant samples, place them in separate bags (labelled 1,2,3 etc)

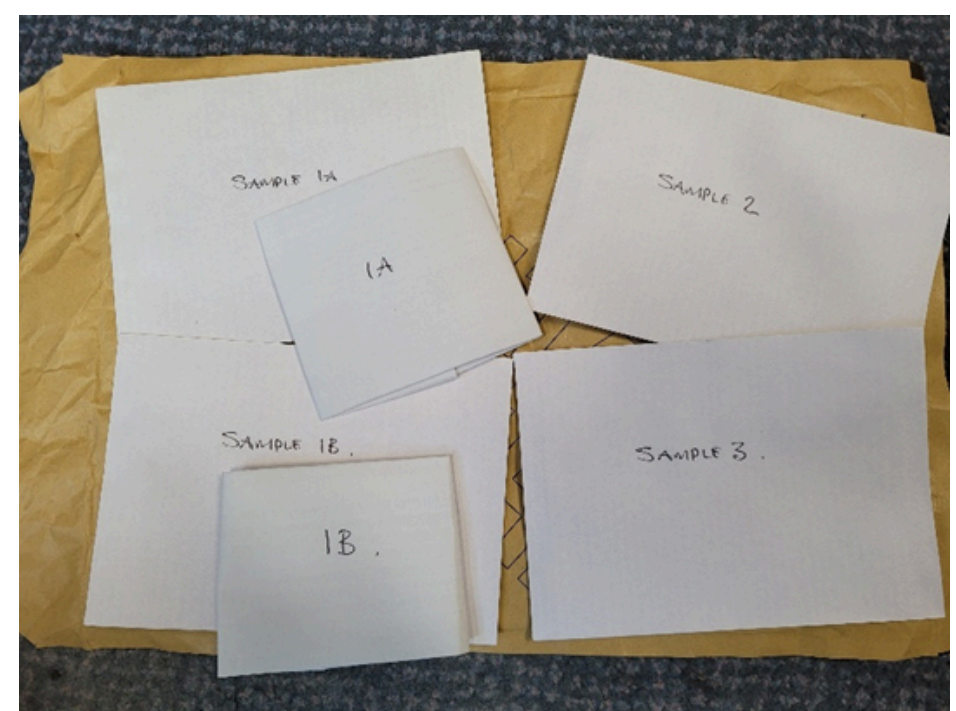
***For rust samples:** Package different sample types separately (i.e. leaves, fruits, twigs), and label with the sample type code. Example: Plant 1 → 1a(fruits), 1b(leaves); Plant 2 → 2a(fruits), 2b(leaves), 2c(twigs)

- Place the labelled bags between two sheets of card, and into a padded envelope. Same package / envelope can be used for posting samples from different plants.
- Store in the fridge at home until you post.

Preparing fireblight samples from multiple plants.



Preparing rust samples from three trees, with different sample types for tree 1.



4

Post your samples:

- Post at the start of the week to ensure samples arrive on a working day.
- You will need to post as a first-class large letter.
- Print a copy of the sampling sheet OR write the following on a paper: your name, email, number of plants sampled.

WE CAN COVER YOUR POSTAGE COSTS!

To receive a prepaid postage label, email: hawthorn.sampling@forestresearch.gov.uk, with the subject line 'prepaid postage label'.

Include:

- Suspected Fireblight or Suspected Rust
- Which address will you be posting to?
- Your address
- How you would like to drop off your item? A) Print label at home and drop off at the post box OR B) Drop off at the Royal Mail Shop and print label with QR code at the Royal Mail Shop

FIREBLIGHT SAMPLES TO BE POSTED TO:

Address:

Brian Carter, Hawthorn Project,
Plant/Soil Sample Reception 04G06,
Fera Science Ltd, York Biotech Campus,
Sand Hutton, York, YO41 1LZ

RUST SAMPLES TO BE POSTED TO:

For samples from northern England (approximately north of York) and Scotland:

Debra Frederickson Matika and Dan Crisp, Hawthorn Project,
Northern Research Station, Roslin,
Midlothian, EH25 9SY

For samples from southern England and Wales:

Ann Barnes, Hawthorn Project,
Plant/Soil Sample Reception 04G06,
Fera Science Ltd, York Biotech Campus,
Sand Hutton, York, YO41 1LZ

How you will receive feedback



Participation Feedback:

Scientists from the project will provide feedback to participants. All feedback related to your participation in this project will be provided **via email**.



1. Submission confirmation:

We will email you to confirm that we have received your photographs and any samples you have posted.



2. Photograph review:

You will receive feedback from project scientist confirming if the photographs submitted are consistent with potential Fireblight or Rust.



3. Laboratory results:

If you send us a sample, we will contact you with the results of laboratory testing and let you know whether Fireblight or Rust was detected.



4. Project summary:

At the end of the project, we will share with you an overview of the project findings at the national level.



Sampling sheet

After checking the plant for symptoms, complete a sampling sheet. If you collect samples from multiple plants, **complete a separate sheet for each plant.**

A sampling sheet must be included with any photographs or physical samples you send. Please, complete this via:

- The **online form [here](#)**,
- Alternatively, complete the sampling sheet below and email to hawthorn.sampling@forestresearch.gov.uk, along with your photographs.

If sending physical samples, include a printed copy of the form or write the following information on a sheet of paper: your name, email address, and the number of plants sampled.

Collector name:		
Collector organisation (If applicable): <i>Name of the Botanic Garden/Arboretum, Observatree volunteer (in association with Forest Research), Tree Warden (in association with The Tree Council)</i>		
Collector email:		
Date of collection (DD/MM/YY):		
Species (Please tick):		<input type="checkbox"/> Common Hawthorn <input type="checkbox"/> Midland Hawthorn <input type="checkbox"/> Hawthorn (unsure what species) <input type="checkbox"/> Orchard tree, please specify:
Plant Number <i>If you are sampling from different plants call them: 1,2,3, etc..</i>		
Is the tree symptomatic or asymptomatic? <i>(Please tick):</i> If symptomatic: Describe the observed symptoms and brief description of photograph/sample <i>Example: Suspected rust</i> <i>1a- fruits have fingers and brown dust</i> <i>1b- Leaves have galls with fingers</i>		<input type="checkbox"/> Suspected Fireblight <input type="checkbox"/> Suspected Rust <input type="checkbox"/> Asymptomatic (email only) <i>Brief description:</i>
Location of the sample (provide as many as you can)	Site name	
	County	
	Postcode	
	8 figure grid reference or what.3.words	
Tree context: <ul style="list-style-type: none"> • Isolated tree, hedgerow, proximity to orchard • Landmarks nearby (this might help you find the hawthorn if you can return in one month) <i>Example:</i> <ul style="list-style-type: none"> • <i>Tree in hedgerow next to allotment.</i> • <i>On Manor road, three electricity pylons down from the turning to Church lane.</i> 		

Frequently Asked Questions

1. What if I am unsure what symptom the hawthorn is displaying or whether it is a symptom at all?

If you are not sure what you're looking at, please still email us your photographs and sampling sheet and post us your samples and sampling sheet.

If you can return to the plant, please send us your photographs and sampling sheet first, and we will let you know whether a sample is needed. Even uncertain observations are helpful, and we will be happy to guide you.

2. Why should you disinfect a cutting tool between uses and not discard infected material elsewhere?

Diseases can spread easily from one tree to another on contaminated tools or through infected material.

- If a tool has touched an infected hawthorn, it may carry bacteria or fungi that can be transferred to healthy plants when you make the next cut.
- Throwing infected material into the wider environment can also spread pests and diseases to new areas.

Cleaning your tools and disposing of infected material safely helps prevent the unintentional spread of tree diseases and protects other hawthorns and nearby vegetation.

If you find you have too much material, leave the excess beneath the hawthorn you took it from. When back at home, if you have hawthorn that you do not post, place it in an individual bag and dispose of it in your normal household waste route or in a public use bin.

3. The sampling sheet asks me to complete an 8-figure grid reference or what3words. How do I do this for a hawthorn plant?

You can record the location of a hawthorn plant using a smartphone or computer.

- If you use a smartphone, it can find your location automatically while you are standing next to the plant.
- If you use a computer, you can use the same apps or websites, but you will need to click on the spot where the hedgerow plant is, rather than your location being detected automatically.

Here are some ways to do it:

• what3words

- Open the what3words app or website
- Stand right next to the plant
- The 3-word location will appear (e.g., tree.path.field)
- Write it down or copy it into the form

• Grid Reference

- Download and install a free app like OS Maps (Ordnance Survey), Grid Reference Finder or MapFinder
- Open the app when standing right next to the plant
- The app will show your grid reference
- Record this on the field form

Tips:

- Stand as close to the plant as possible.
- Give the location, even if you're not totally sure; your best effort is fine.

4. Can I just send photographs and the sampling sheet and not post my samples?

We cannot confirm the disease species from a photograph alone. The samples are essential for our molecular work, which will determine if Fireblight or Rust are present.

- Photos are very helpful for checking symptoms and deciding whether a sample is needed.
- Physical samples are essential for laboratory testing and for confirming the species.

If you cannot post a sample, a photograph is still useful — but it limits what we can confirm.

5. Can I withdraw from this research if required?

If you do wish to withdraw your contribution, you may do so within one month of sending your sample or photograph. To withdraw, please contact the research team no later than 1 October 2026. After this date, all photographs and physical samples will be anonymised, meaning it will no longer be possible to identify or remove your individual data.

Please ensure you have permission from the landowner before taking a photograph or collecting a physical sample, to reduce the likelihood that you will need to withdraw from this research.

6. What can I expect to happen to my sample data?

Your data will be used to enable us to map where we have found Fireblight or Rust on hawthorn once we have confirmed the species. It is also helpful to know when you found the infection (month), or where it was absent from if you did not find it. For Fireblight, the DNA sequences will help us to determine whether the same pathogens are moving between (cross-infecting) hawthorn and apple and pear orchards. For Rust, we are interested in knowing the geographical locations of the different species and whether their distributions overlap.

Glossary

- **Aecium (pl. aecia):** A reproductive structure produced by parasitic rust fungi as part of their life cycle. The aecia produce the powdery rust spores (aeciospores) that can infect a different host.
- **Asymptomatic:** A host showing no signs nor symptoms of disease (although some pathogens may be present).
- **Biosecurity risk:** The threats posed by the introduction and spread of harmful organisms, such as pests and pathogens, which endanger environmental, agricultural, and human health.
- **Black or brown necrotic plant tissue:** Symptom of Fireblight; plants will have decaying spots on leaves, blackening stems, or distorted, black-streaked foliage.
- **Deciduous:** A tree or shrub that sheds its leaves annually.
- **Droplets of exudate:** Symptom of Fireblight; small, sticky droplets may appear on infected branches. These droplets are usually amber or honey-coloured and contain bacteria released from the plant.
- **Fireblight (scientific name is *Erwinia amylovora*):** Bacterial disease that can infect hawthorns and orchard trees (such as apple and pear). Infected plants will have the following symptoms:
 - Leaves and shoot tips are wilting from the tip (black necrotic plant tissue)
 - 'Shepherd's crook' bending from the tip
 - Reddish-brown inner bark
 - Droplets of exudate emerging from an infected stem
- **Fruit (haws):** Red pomes (small apple-like or berry-like fruits) on a hawthorn containing one or more seeds. Only the fruit is edible as seeds are toxic.
- **Galls or swellings:** A possible symptom of Rust. Swollen tissues with soft 'fingers' or 'hairs' appear on leaves or stems. Please note, these are not to be confused with insect galls that would not have the protruding 'hairs'.
- **Host:** The type of plant (species) that a bacterial or fungal disease can infect. A host can show symptoms of the disease and may also help the disease spread to other plants.
- **Hybrid:** an offspring of two plants of different species.
- **Lesion edges (live/dead junction):** This refers to the boundary between healthy and diseased tissues. This junction is critical for identifying active infection in which there are live pathogens. It often features as a crack, or clear dividing line, separating the dead, dark-coloured tissues from the still healthy tissues beneath the bark. In fact the live tissues, although asymptomatic, may still contain bacteria and is required for the isolation of live Fireblight pathogens.
- **Pathogen:** An organism or infectious agent that causes disease in its host, such as bacteria or fungi, commonly known as germs.
- **Rusts (scientific name is *Gymnosporangium*):** Fungal disease that can infect hawthorns, characterised by the shedding of powdery, cinnamon-brown spores. Hence the name. Infected plants may show the following symptoms:
 - Bright orange-yellow spots or red swollen spots on the upper surface of leaves
 - Rust/ cinnamon dust on the underside
 - Small, soft, cream/ pale brown, hair-like structures (around spore-releasing aecia) growing from leaves, stems, shoots and fruits
 - Galls or swellings on the leaves or stems with the soft, hair-like fingers
- **Shepherd's crook:** A symptom of Fireblight; plants wilt, turn brown/black, and the stem curls downward.
- **Spores:** Brightly coloured (yellow, orange, red, or brown) reproductive particles produced by rust fungi to infect plants. *Gymnosporangium* aeciospores on hawthorn will be cinnamon-brown.
- **Stigma:** The receptive tip of the female reproductive organ, found in the centre of a flower, designed to catch and trap pollen to fertilise the ovary.
- **Symptomatic:** A host showing signs of disease or the signs of a disease on a host.



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Forest Research



Fera

Thank you for your participation!

For any questions, please contact:

hawthorn.sampling@forestresearch.gov.uk

Your queries will be received by Forest Research, Fera and The Tree Council and the relevant member of staff will get back to you as soon as possible.