

Stem cracking in British conifers: potential impact on economic resilience and current assessment efforts

Rubén Manso & Thomas Baer
FR Tree and Wood Properties team

Stem cracking



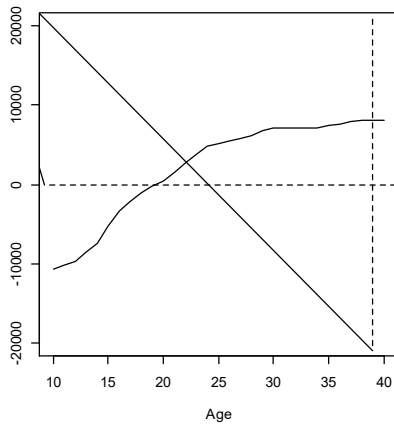
Consequence

Log rejection at sawmill & loss timber value

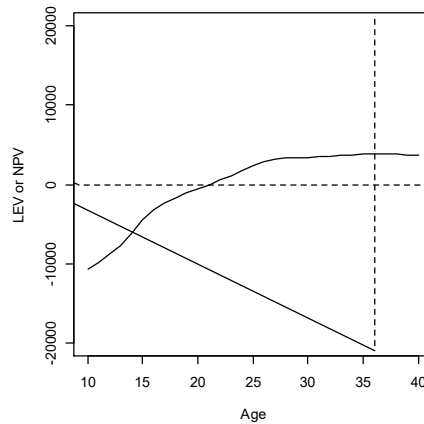


Consequence

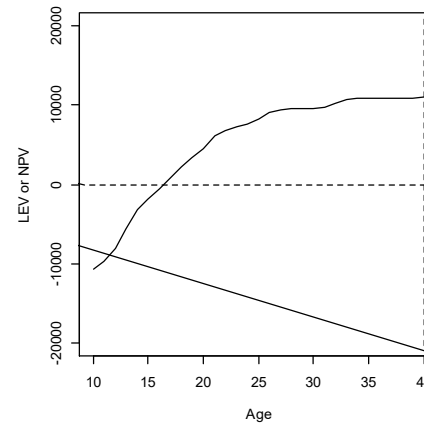
Brecon



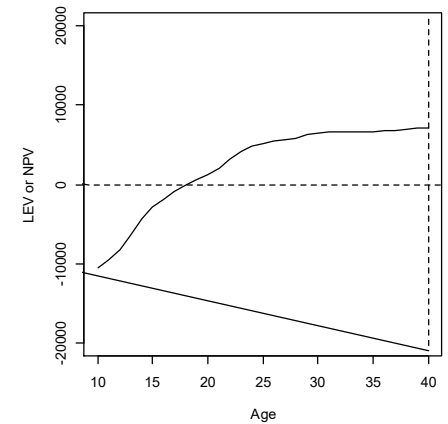
Kintyre



Radnor



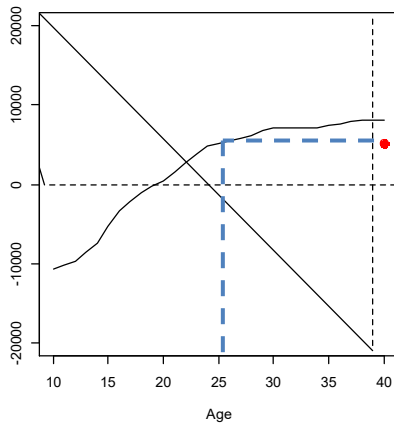
Spadeadam



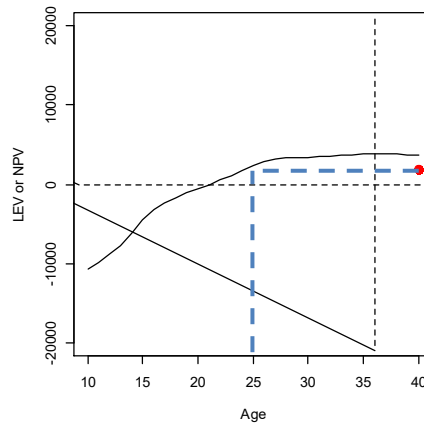
Age

Consequence

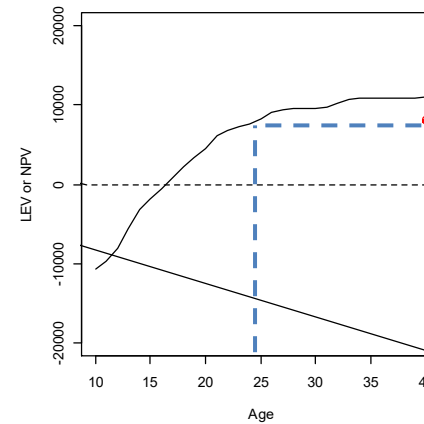
Brecon



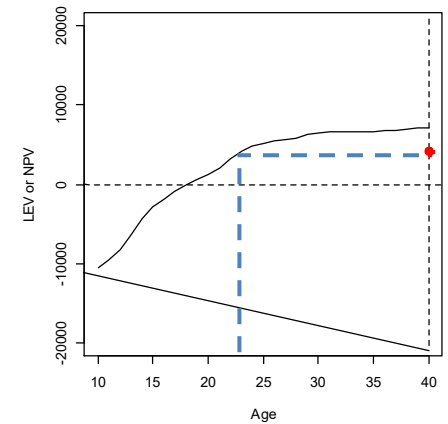
Kintyre



Radnor

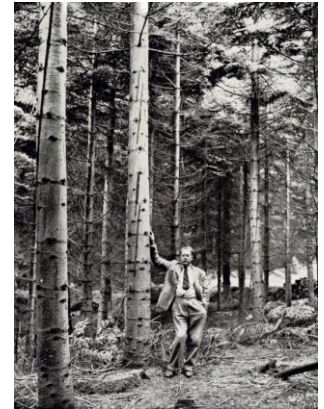
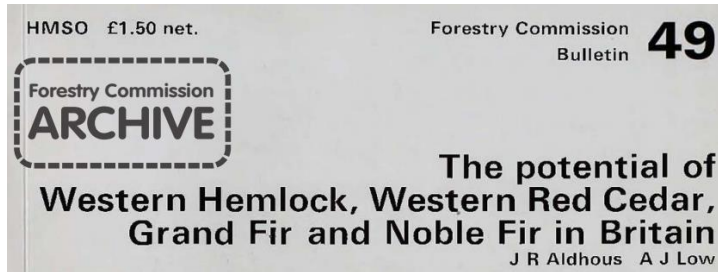


Spadeadam



Age

Species and incidence



Species	Prop. stands affected	Prop. Trees affected
Western hemlock	8/72	<1/3
Western red cedar	0/48	0
Grand fir	24/67	1/3-2/3
Noble fir	16/26	1/3-2/3
Sitka spruce	1/44	<1/3

Species and incidence

Variation in the incidence and severity of drought crack in three conifer species in North East Scotland

Andrew Cameron , Duncan Orr & James Clark

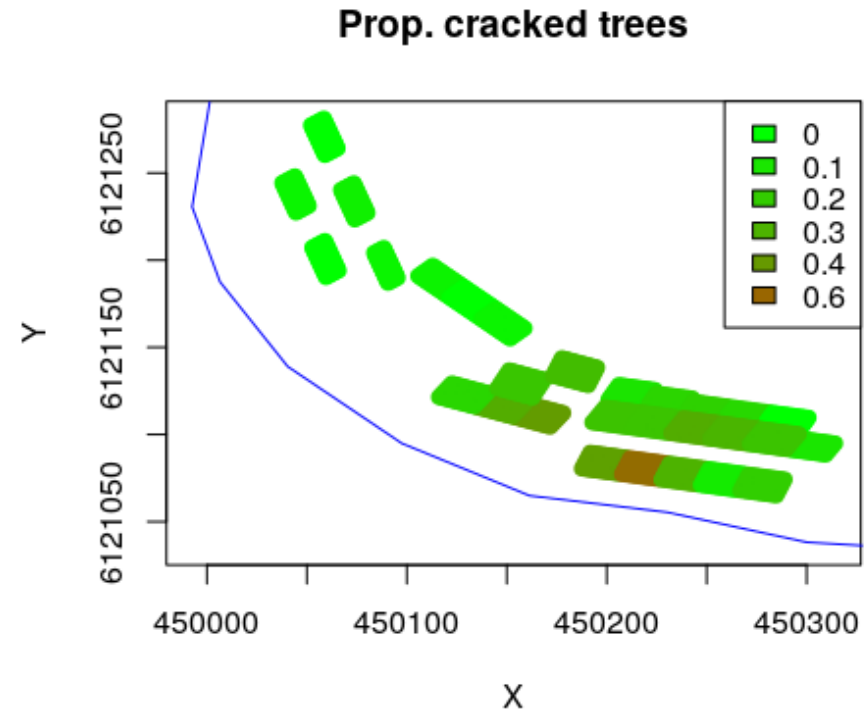
Pages 658-662 | Received 22 Mar 2017, Accepted 23 Jul 2017, Accepted author version posted online: 27 Jul 2017, Published online: 09 Aug 2017

 Cite this article  <https://doi.org/10.1080/02827581.2017.1360936>



Species	Prop. stands affected	Prop. Trees affected
Grand fir	-	13%
Noble fir	-	16%
Sitka spruce	-	3%

Species and incidence



Species	Prop. stands affected	Prop. Trees affected
Norway spruce	1/2	1/3-2/3

Species and incidence

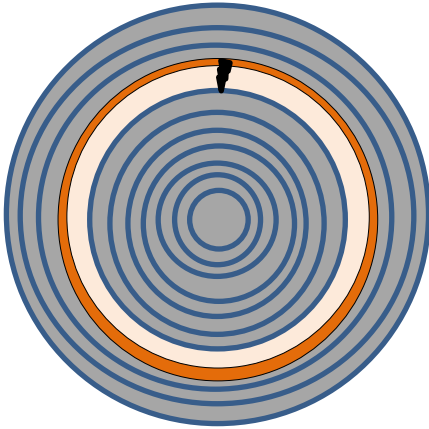
The UK Forestry Standard

The governments' approach
to sustainable forestry



Maintain or establish a diverse composition across the forest management unit so that no more than 65% of the area is allocated to a single species. Enhance resilience and seek to mitigate the risks from climate change and pests and diseases by selecting species appropriate to the site using Ecological Site Classification or a similar tool.

Causes



"Weak" ring



Predisposition factors

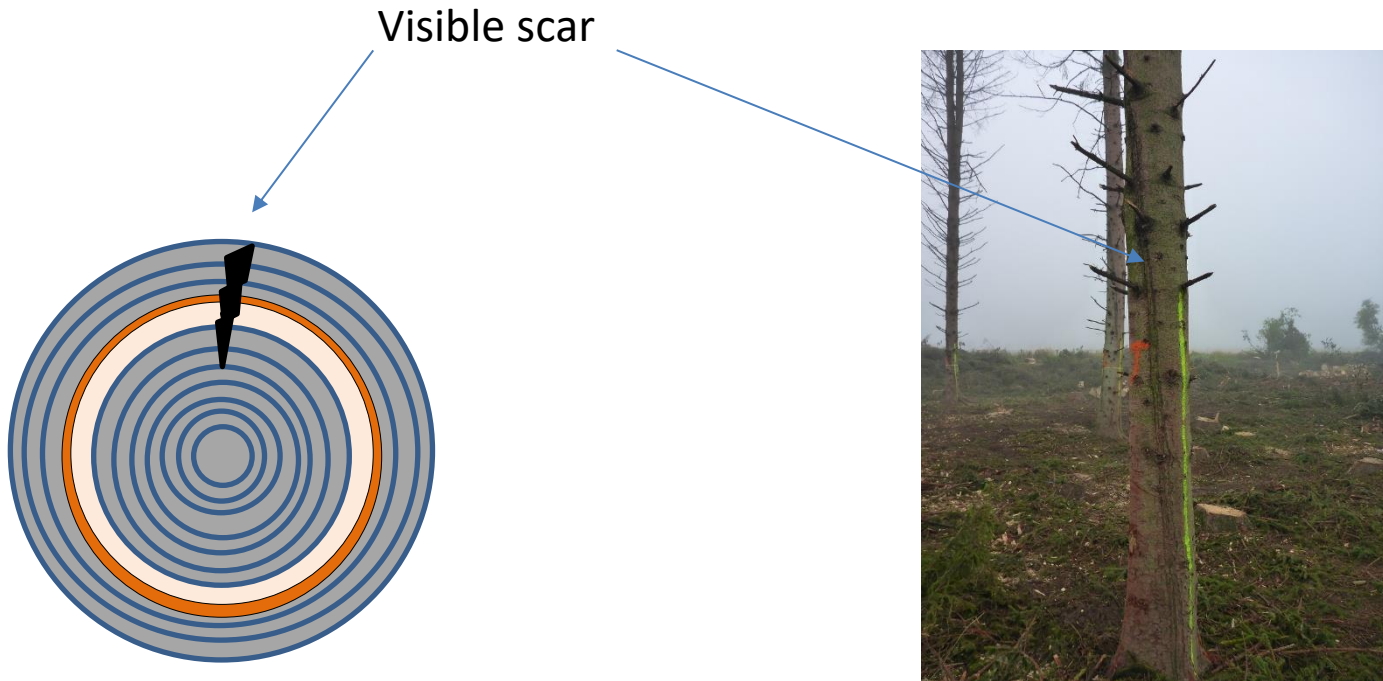
+

Hydraulic stress
(e.g. drought)

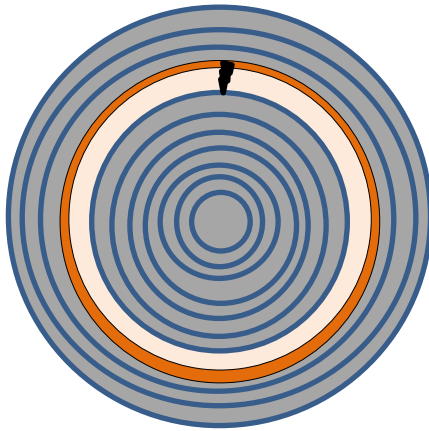


Triggering factors

Causes



Causes

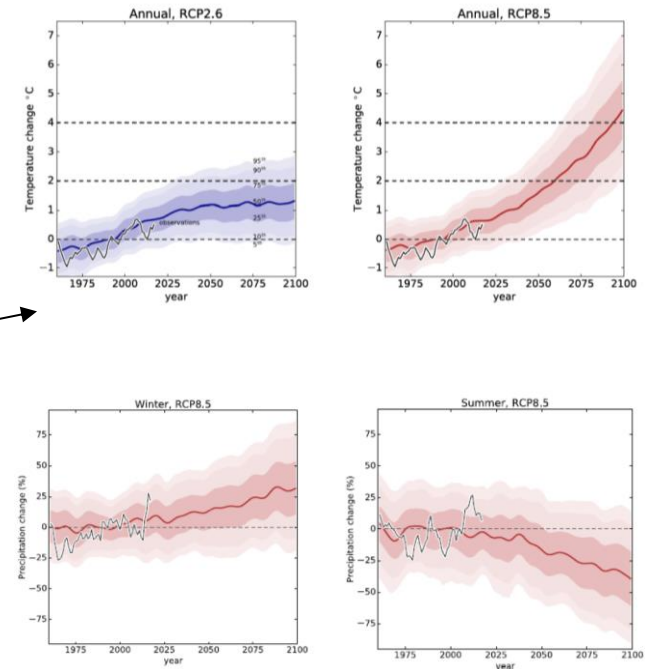


"Weak" ring

+

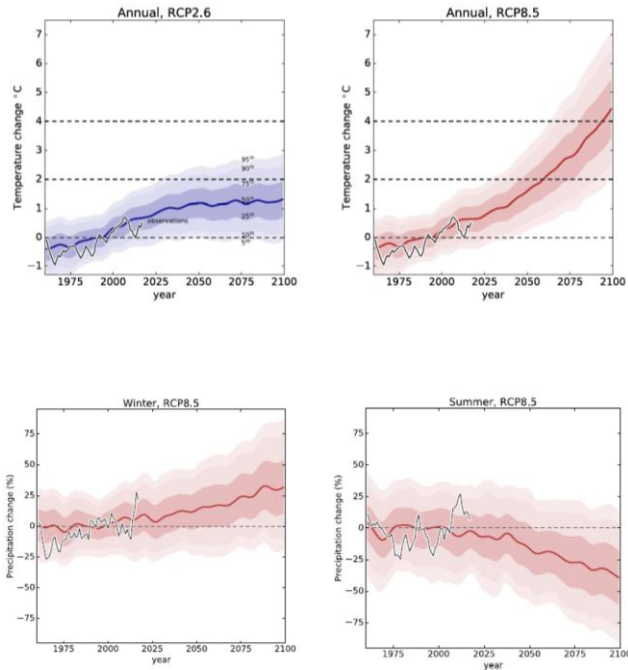
Hydraulic stress
(e.g. drought)

Future UK climate



/!\ Potential increase in cracking occurrence /!\

/!\ Warning /!\



+

The UK
Forestry
Standard

The governments' approach
to sustainable forestry

Causes

Abnormal growth?
Genetics?
Size?



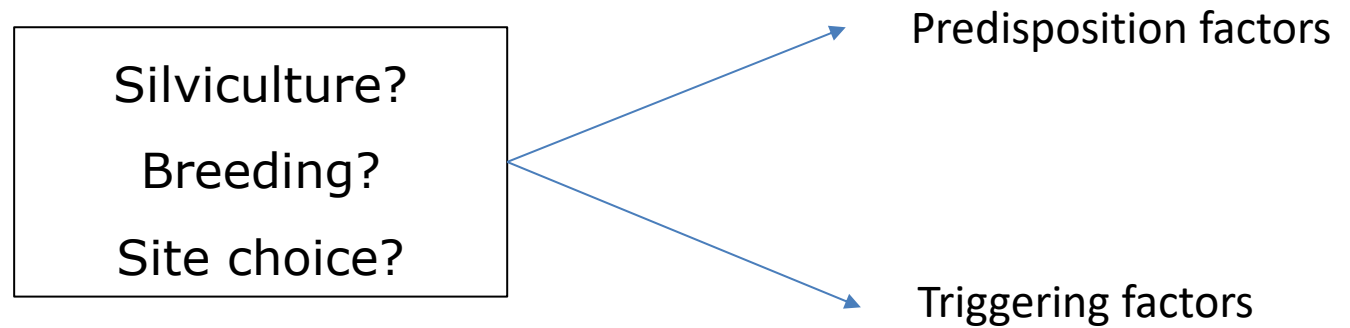
Predisposition factors

Drought?
Soil depth?
Wind?



Triggering factors

Solutions?





Studying stem cracking

Studying stem cracking

First step: to find out where this happens

Studying stem cracking

First step: to find out where this happens



Quite hard
(unknown distribution)



- Systematic inventory non-viable
- Expert survey as an alternative

Studying stem cracking

First step: to find out where this happens

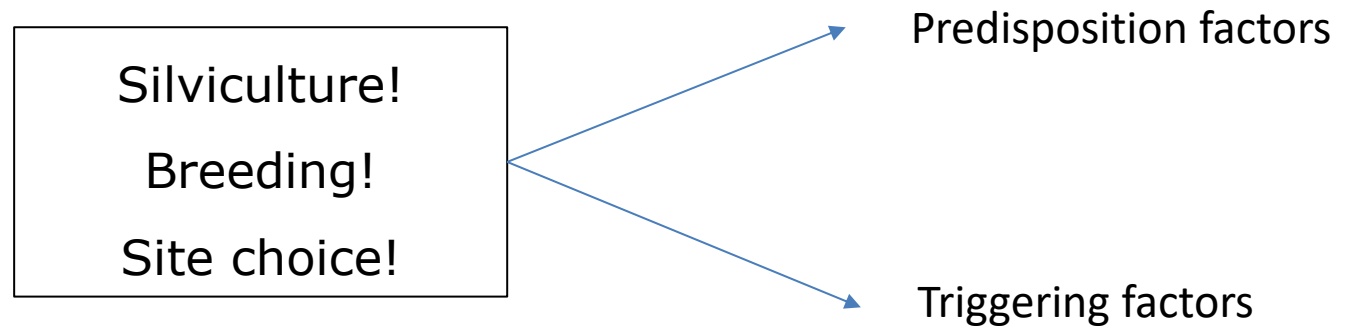


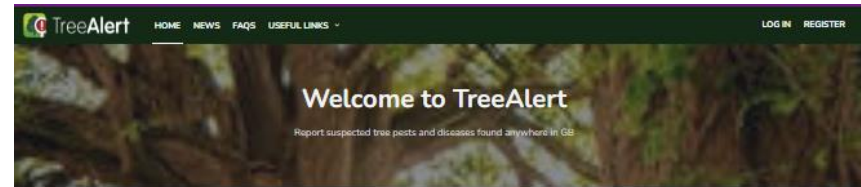
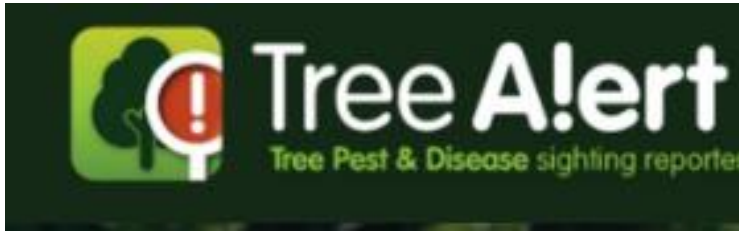
Studying stem cracking

First step: to find out where this happens

- Then:
 - Exploratory quantification and mapping
 - Samples (i.e. discs)
 - Empirical analysis
 - Determine crack years
 - Study what happened in those years

Solutions!





Abiotic Reports

Submit a report of damage not caused by a pest or disease, including

- Stem Cracking

About

Forest Research is the research agency of the [Forestry Commission](#) and Great Britain's principal organisation for forestry and tree-related research. We are internationally renowned for the provision of science, research, evidence, data and services in support of sustainable forestry.

Within Forest Research, the Tree Health Diagnostic and Advisory Service provides advice and where possible diagnosis and identification of tree pests and diseases.

Tree Alert is used to gather information about tree health issues across Great Britain. This information supports important tree health monitoring and surveillance work, contributes to ongoing scientific research, and helps to protect the nation's trees.

Tree Health Reports



How to submit a report

To submit a useful report of a tree health problem you will be taken through a series of pages where you will be asked a number of questions about your observation. The more information you can provide, the more useful your report will be.



What we do with your reports

We use the data obtained through TreeAlert to follow-up findings, to identify trends of spread, to direct surveys looking for regulated or quarantine pests and pathogens and to support pest and disease management.



Pests and Diseases

If you want to know more about any specific pests and diseases then the main Forest Research website has a range of information available. Alternatively, the [Close-vetree](#) project has a range of guides, posters and videos which can help with trying to identify a pest or disease.

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.



Pest or Disease Specific Reports

Submit a report of a specific tree pest or disease that you have seen.

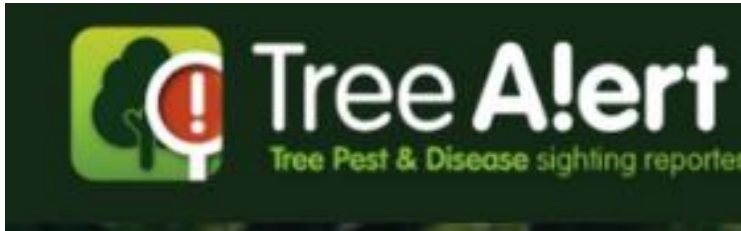
- Chalara Dieback of Ash
- Dothioroma Needle Blight
- Acute Oak Decline
- Phytophthora lateralis
- Ashy/Citrus Longhorn Bawle
- Oak Processionary Moth



Abiotic Reports

Submit a report of damage not caused by a pest or disease, including

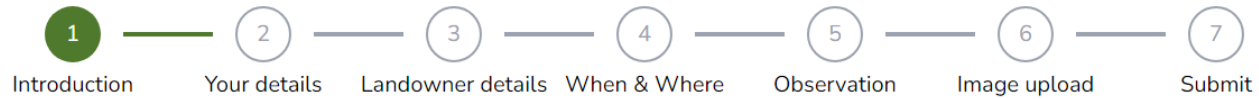
- Stem Cracking
- Oak Shrike



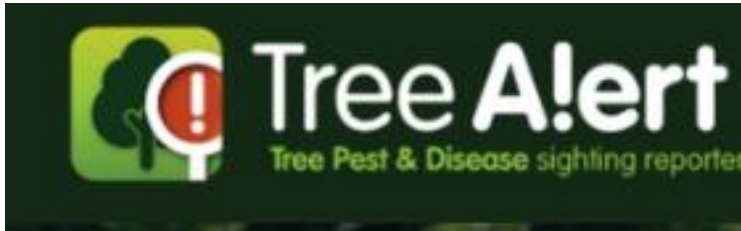
 **Tree Alert**
Tree Pest & Disease sighting reporter

[HOME](#) [USER DASHBOARD](#) [FAQS](#) [USEFUL LINKS](#) ▼

[Dashboard](#) > [Stem Cracking](#)



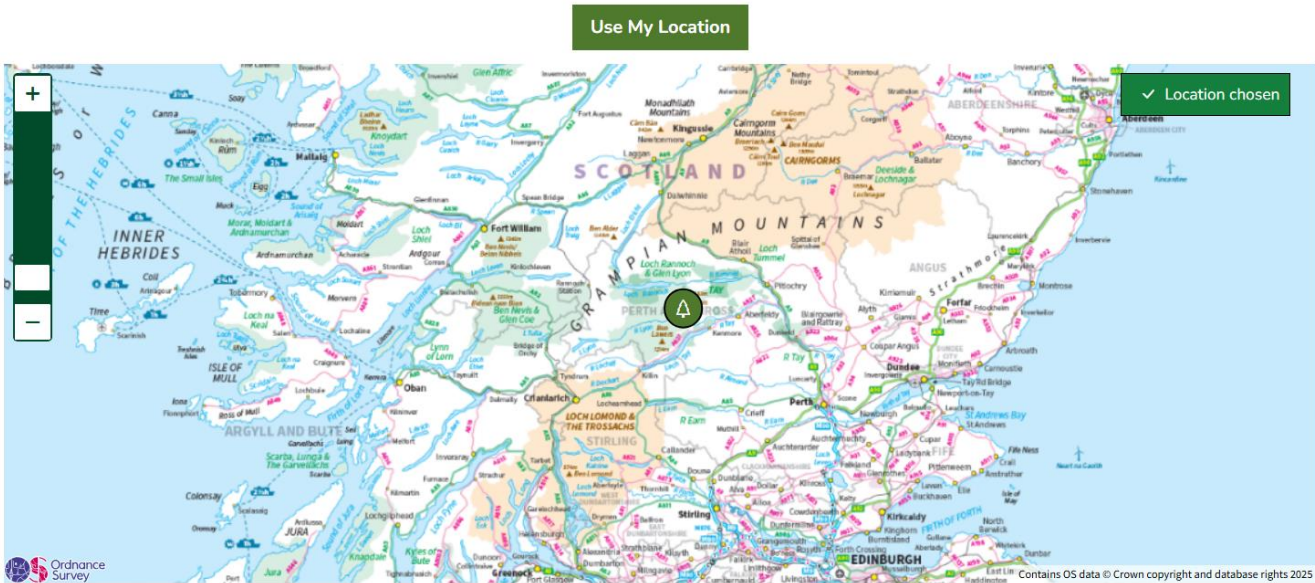
Introduction to Stem Cracking

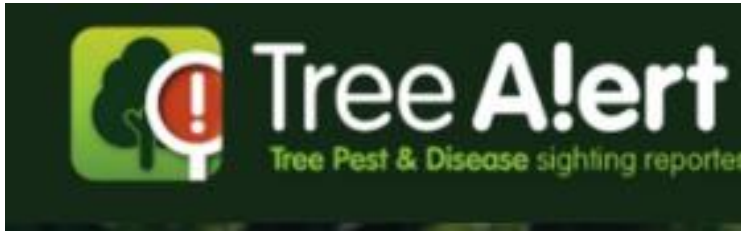


LOCATION

POSTCODE

OS Grid Reference *
NN7007351105





Tree Details

Age of affected trees

Has the tree(s) been recently planted? *

- ☐ Yes
- ☐ No
- ☐ Don't know

What is the approximate age of the trees affected? *

- ☐ Young
- ☐ Mature
- ☐ Old
- ☐ Mixed

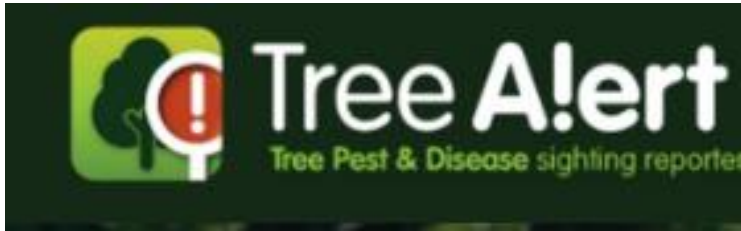
Size and number of affected trees

How many trees are showing signs of poor condition? *

- ☐ One
- ☐ A few (up to 10)
- ☐ Many (more than 10)

What is the approximate diameter of the stem / trunk? *

- ☐ Less than 5cm
- ☐ 5-15cm
- ☐ 15-30cm
- ☐ Greater than 30cm
- ☐ Mixture of diameters



Tree Species

Type of affected trees

At present we are only looking to collect information regarding coniferous trees.

Please indicate the general tree type *

☒ Coniferous

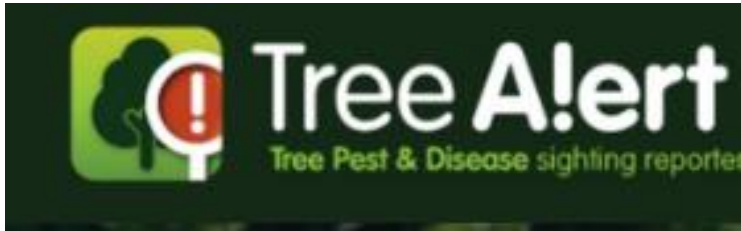


Common name

Spruce

Species

Sitka spruce



Upload Images

Details

Please be aware you will not be able to submit a report without uploading photographs of your observation.

To complete the report we need you to upload at least 1 photograph of the affected trees.

For more information about what we are looking for in the submitted photos please read the [How to take a photo](#) article on our website.

Damage in context photo *

Please upload a photo that shows the damage in context on the affected tree. So, where the damage is on the tree.

Drag & Drop images here, or click to browse

Affected tree(s) in context photo

If you have a photo that shows the affected tree(s) in context - so where the tree is and how it relates to its surroundings, please upload that too.

Drag & Drop images here, or click to browse

Damage details photo

If you have a photo that shows the detail of the damage, please upload that too.

Drag & Drop images here, or click to browse

FORESTRY & TIMBER NEWS

August / September 2025 Issue 130



Foresters urged to report evidence of stem cracks in conifers

Dr Rubén Manso and Thomas Baer outline the issue of stem cracking and seek input on compiling evidence to determine the cause.

The demand for structural timber has been increasing both in the UK and worldwide in recent years. This trend is expected to continue as a result of the implementation of policies that aim to mitigate the effects of climate change.

One measure included in these policies is the substitution of timber for traditional construction materials, which typically come with a significant carbon footprint (e.g. concrete, steel). The Timber in Construction Roadmap is an example of such policies in the UK. The supply of domestic gradable timber in the UK largely depends on conifer planted forests. The range of strength classes and yield one can expect from this UK-grown timber resource has been studied for decades in principal species such as Sitka spruce, Scots pine or larch, and is now well understood.

The impact on the supply chain of large defects found in logs and/or standing timber, such as cracks, shakes or splits, has however received

significantly less attention in spite of recent efforts in academia.

One of such defects is stem cracking, commonly referred to as drought cracks. Stem cracking renders the affected timber unsuitable for structural uses. This defect is very common in Norway spruce and some firs grown in Britain but can also occur in Sitka spruce.

The issue seems to be driven by internal tensions in the tree. When internal tensions develop into a crack, the fault propagates vertically and radially, hitting the cambium and causing a scar or set of scars to form on the bark that often spiral up the tree. This enables cracked trees to be identified for many years after the cracks occur (Fig 1). The scars typically bear a healthy appearance, with no resin exudates coming out from them, and appear to be wide but sealed, as opposed as what one would expect from recent disease, deer or machinery damage (Fig 2).

The internal tensions that lead to cracking have been associated with different forms of water deficit, including drought. As a result of this, an increase

in this type of defect can reasonably be expected in Britain in the near future due to climate change. Given this and the efforts to diversify the UK conifer stock with spruce and fir species that may be prone to cracking, it seems relevant – and timely – to give more consideration to this issue.

At present, however, there is only anecdotal evidence on the rates of stem cracking occurrence or geographical areas of prevalence. The predisposition factors that make trees vulnerable to stem cracking are also unclear, although some sources point to abnormal, potentially climate-mediated, earlywood/latewood ratios within tree rings, tree age and size, and micro-site conditions that affect the rooting depth. Lastly, a recent study conducted by Forest Research has also gathered strong evidence that genetics could play a key role in this regard, at least in British Sitka spruce.

To provide answers to these questions, Forest Research has embarked on further research. The short-term objective is to assess the problem



Grand fir (*Abies grandis*)



Noble fir (*Abies procera*)



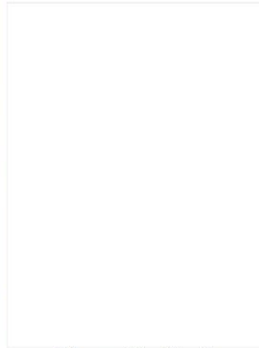
Norway spruce (*Picea abies*)



Norway spruce (*Picea abies*)



Norway spruce (*Picea abies*)



Sitka spruce (*Picea sitchensis*)



Sitka spruce (*Picea sitchensis*)

Thank you
(for listening
and reporting)!

Stem cracks in conifers – report it via TreeAlert

<https://treealert.forestresearch.gov.uk>