

# Understanding a new health threat to Caledonian Scots pine (*Pinus sylvestris*)

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## Policy Summary



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# 1 Policy Summary

## 1.1 Background

This study was initiated in response to a new health threat to Scots pine manifesting itself in the form of multiple blackened cankers and dieback of shoots and branches, particularly in the lower crown. Trees are affected across a range of site types including natural Caledonian pine forests, planted native woodland and commercial plantations. Scots pine is regarded as iconic in Scotland for a range of ecological, cultural and economic reasons. Therefore, it is a research priority to gain an understanding of the extent and causes of the canker disease for better protection of this species in the future.

## 1.2 Key Research Questions

The objectives of this study were to:

- Determine the geographical extent of symptoms on Scots pine across Scotland.
- Identify and describe the agent/s responsible for the canker symptoms.
- Investigate historical, ecological and genetic information which may shed light on the drivers of this new health threat.

## 1.3 Main Findings

We investigated the geographical extent of symptoms in the UK, which occurred predominantly across most regions of Scotland, and identified three causative agents involved in the outbreak of canker disease of Scots pine: *Curreya pithyophila* in association with *Pineus pini* as the primary agents of bark killing and *Crumenulopsis sororia* as a secondary invader of the damaged bark. *Curreya pithyophila* is a previously obscure stroma-forming fungus, which can infest young shoots, branches and main stems of Scots pine trees, most typically at branch junctions. Beneath the stroma are immature colonies of the native Scots pine woolly adelgid, *Pineus pini*, which feeds on the tree, initiating wounds. These wounds are then invaded by a longstanding fungal pathogen of pine, *Crumenulopsis sororia*, which causes the blackened, perennating cankers that expand, killing branches.

Using information gained from past literature, and our own morphological and genetic analyses of isolates, we surmise that the current populations we assign to *C. pithyophila* in the UK actually consists of two distinct but co-occurring species, at least one of which may be a recent introduction. Historical reports suggest that previous *C. pithyophila* outbreaks occurred on plantation Scots pine in Perthshire in the 1900s and north-east Scotland in the 1960s, with sporadic findings from the 1970s onwards. The relatedness of our specimens of *C. pithyophila* causing the current outbreak to the fungal specimens causing the previous outbreaks is unknown. Further investigations are required to understand the drivers behind this current widespread outbreak of *C. pithyophila* and *P. pini* on Scots pine in Scotland.

## 1.5 Recommendations

Given the vast potential for inoculum production by all three main agents and the knowledge gaps that still exist in terms of understanding the drivers and longevity of this outbreak, it is difficult at this time to give a prognosis for the future development of the disease in Scotland or provide clearly informed management guidance. However, our research has demonstrated that the presence of the adelgid is required for colonisation by *C. pithyophila*, that there is almost certainly the potential to introduce the problem to new sites via infested planting material as young trees are susceptible, that weak or stressed trees appear most susceptible, and infestations typically start on the lower branches.

We therefore recommend the following actions based on our current understanding of the disease to date, with more informed advice to come pending further research:

- Plant only healthy stock which is visibly free of adelgids or fungal infection.
- Source stock that has been propagated and grown in the UK by a reputable nursery, preferably one that is Plant Healthy certified [Welcome to Plant Healthy – Plant Healthy](#).
- Only plant Scots pine on sites that are deemed suitable for this species. The Ecological Site Classification (ESC) tool can be used to assess site suitability [Ecological Site Classification \(ESC\) – Forest Research](#).
- Match Scots pine provenance to site to ensure maximum vigour.
- Early brashing to remove susceptible lower branches may help prevent the disease establishing.
- Monitor Scots pine plantings for signs of *C. pithyophila* infestations and report any findings to the Tree Health Diagnostic and Advisory Service of Forest Research via [Tree Alert](#).

### 1.6 Next Steps

Further investigations are required to understand the drivers and timeframe of this widespread outbreak of *C. pithyophila* and *P. pini* on Scots pine in Scotland to allow an accurate prognosis for the future health of this species. These investigations should focus on determining:

- Whether one or both forms of *C. pithyophila* in Scotland represent new introductions into the UK or whether climatic factors may have triggered the outbreak.
- When the outbreak might have started, through dating of cankers from key sites, including Caledonian pine sites in the east and west Highlands.

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