

INVESTIGATION OF A POTENTIAL NOVEL DISEASE OF *TILIA* TREES IN THE UK



Tilia trees in the UK

Three native species of *Tilia*, commonly known as lime or linden occur naturally in the UK. These include the large-leaved lime (*Tilia platyphyllos*), the small-leaved lime (*Tilia cordata*) and their hybrid the common lime (*Tilia x europaea*). The naturally occurring population is mainly found in old woodlands, but due to their poor ability to colonise, they are often rare or absent in new forests. Over the last 2000 years, their distribution in European woodlands has declined, and the naturally occurring population is now considered highly fragmented leaving them vulnerable to ecological deterioration.

However, the majority of *Tilia* trees in the UK are found in urban areas such as parks and cities where they provide a range of ecosystem services including air quality improvement and carbon storage and sequestration. In terms of health, *Tilia* are considered relatively healthy species due to the absence of serious pests and diseases threatening their survival in woodlands. However, increasing reports of symptomatic *Tilia* and the negative impacts of climate change have highlighted the need for further research to determine the threats posed to the declining *Tilia* population.

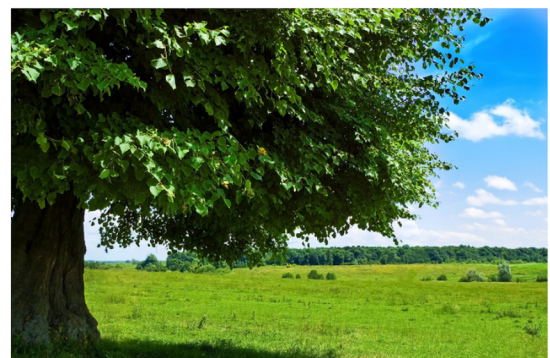
Project background

This three-year PhD research project (undertaken by Helene Kile at the University of the West of England) was initiated in January 2023, and will evaluate the risks to *Tilia* health through monitoring, detection and microbiome analysis.

Over the past ten years, there have been increasing reports of *Tilia* species and hybrids with symptoms of bleeding cankers in several counties in the UK. *Phytophthora plurivora* is suspected to play a role in these *Tilia* bleeding canker cases, but a novel bacterial species, *Brenneria tiliae*, has also been isolated from four sites in Gloucestershire, and one site each in Wiltshire and Shropshire. Given the devastating environmental effects caused by *Phytophthora* species and the pathogenic potential of members of the genus *Brenneria*, either or both of these microorganisms may constitute a new threat to an already deteriorating *Tilia* population in the UK.

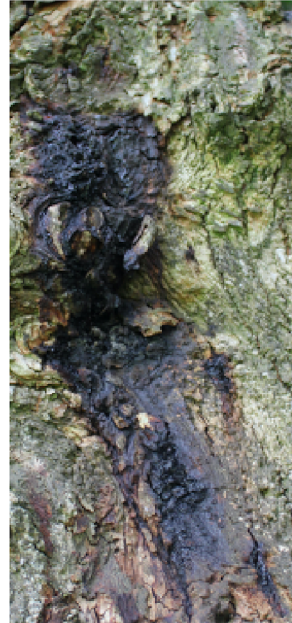
The project aims to determine the agent(s) responsible for the symptoms, whether these agents can be linked to specific symptoms and the potential threat posed by this previously undescribed disease to *Tilia* trees in the UK.

The project is funded by Friends of Westonbirt Arboretum and UWE. The research is in collaboration with Westonbirt Arboretum and will be undertaken at UWE.



Symptoms of disease

There have been increasing reports of *Tilia* displaying symptoms of necrotic lesions and bleeding cankers on the trunk of the trees. The cankers typically extend longitudinally, varying in size from only a few centimetres to nearly 2 m. Some trees have several cankers while others have just one and the location on the trunk varies from ground level up to 2.5 - 3 m. Cankers appear moist and sometimes wet with a dark exudate, hence the term bleeding canker. Older cankers can be dry, and stained weep marks from current and previous bleeding episodes have also been observed. The colour of the cankers varies from mid- and dark brown to nearly black. Some cankers have a hint of black-purple while others have a red and rust-brown appearance. The canopies of these trees are not noticeably affected.



How you can help!

We will continue to sample *Tilia* trees showing disease symptoms across the UK over the course of the project. We would greatly appreciate any reports of *Tilia* suffering from lesions and bleeding cankers resembling those described above. Please let us know their location, a short description of the symptoms and images if possible. This provides a unique opportunity to get involved and contribute to this important research.

References

Brady, C and Coutinho, T. (2021) BMSAB; Forestry Commission (2020) Crown; Honnay, O *et al.*, (2004) CABI; IUCN (2017); i-tree (2015) Treeconomics; Jaegere, T *et al.*, (2016) Forests; Kile, H *et al.*, (2022) Int. J. Syst. Evol. Microbiol; Logan, S *et al.*, (2015) Tree Genet. Genomes; Pigott, D (2012) C.U.P; Rackham, O (2008) New Phytol; Radoglou, K *et al.*, (2009) Bondenkultur



Contact information

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Useful links:

Dr Carrie Brady's UWE profile:
<https://people.uwe.ac.uk/Person/CarrieBrady>

Journal article describing *B. tiliae*:
<https://pubmed.ncbi.nlm.nih.gov/36208419/>

Additional project information:
<https://info.uwe.ac.uk/news/uwenews/news.aspx?id=4268>

Blog post describing the previous sampling:
<https://www.bspp.org.uk/sampling-at-westonbirt-arboretum-unexpected-findings-in-a-diseased-lime-tree/>