Finding a long term strategy for tree health

A new project, 'Promoting resilience of UK tree species to novel pests and pathogens: ecological and evolutionary solutions (PROTREE)' will aim to find sustainable approaches for securing tree health through research on the ecology and evolution of tree species and their pests and pathogens, and their social and economic context.

Tree health depends on many things

Trees face a variety of challenges to their health from many different threats, often at the same time. To find a sustainable long-term strategy for keeping our trees healthy, the range of real and potential threats to tree health needs to be considered, along with the trees' potential to adapt. This not only includes recognising important pests and pathogens, but also understanding how trees are adapted to cope with these threats and other pressures resulting from climate change and habitat fragmentation. These issues need to be understood in a physical, social and economic context so that workable management options can be identified.

"Trees face a whole range of problems – more new pests and diseases, climate change and forest fragmentation" explained Dr Stephen Cavers, an ecologist at the Centre for Ecology & Hydrology in Edinburgh and leader of the PROTREE project, "these challenges are connected, so it is essential we try to understand them together if we want to protect tree health in the long term."

Case study of an iconic native species

Using the example of Scots pine, an important native tree species, this project will assess variation and evolution in three key threat species: the *Dothistroma* needle blight fungus, pine-tree lappet moth and the pine pitch canker fungus. It will explore the role of associated communities and the extent of genetic variation in determining Scots pine's resistance to these threats and, using new and existing field trials, measure the extent to which Scots pine populations may be able to adapt. At the same time, by working with people who manage and use trees, and with the public, the researchers hope to find ways to use the new biological information to facilitate socially desirable change in practical forest management.

Other tree species

Although Scots pine will be the case study species, the objective of the project is to create a practical way to gather similar information in other tree species, establishing transferable experimental protocols and an open access online database. This will lay the groundwork for bringing together information on health issues for all of the UK's important tree species, and ultimately help to improve the resilience of forests across the country.

"Although there are many threats, trees are adaptable and resilient." said Dr. Cavers "We can use that adaptability to help our trees to cope with changes in the future."

Project partners

The project is led by:

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and is a consortium with the following partners:

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Dr Glenn Iason, James Hutton Institute
Dr Steve Woodward, University of Aberdeen
Dr Peter Hoebe, Scotland's Rural College
Dr Chris Ellis & Dr Jo Taylor, Royal Botanic Garden Edinburgh

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Other

The **Centre for Ecology & Hydrology** (CEH) is the UK's Centre of Excellence for integrated research in the land and freshwater ecosystems and their interaction with the atmosphere. CEH is part of the Natural Environment Research Council, employs more than 450 people at four major sites in England, Scotland and Wales, hosts over 150 PhD students, and has an overall budget of about £35m. CEH tackles complex environmental challenges to deliver practicable solutions so that future generations can benefit from a rich and healthy environment. **www.ceh.ac.uk** You can follow the latest developments in CEH research via **CEHScienceNews on Twitter** and our **RSS news feed**

The Institute of Evolutionary Biology (IEB) at the **University of Edinburgh** is a centre of excellence for evolutionary ecology & molecular evolution. It houses one of the strongest groupings of evolutionary biologists in Britain with world class expertise in areas ranging from quantitative genetics through to molecular ecology.

The **James Hutton Institute** is an international research centre addressing research questions at the top of the global environmental and land use agenda. This includes application of basic knowledge of plant resistance from the genomic level upwards, and the ecology of pest species, to food security and environmental issues.

Forest Research is the research agency for the Forestry Commission. FR undertakes research to inform and support forestry's contribution to UK governmental policies, and

provides the evidence base for UK forestry practices. Our experts in forest sciences and land use management focus on the use of applied science for tree, woodland and forest sustainability. FR has particular expertise in Genetics & Tree Breeding, Tree Health (pests and diseases), Climate Change and Social Sciences.

The **Royal Botanic Garden Edinburgh** is a world-leading centre for research on the biodiversity and taxonomy of plants in the UK and the tropics. As well as high quality research facilities and internationally recognised staff, the RBGE has a remit and reputation for communication of science to the public and is experienced in knowledge exchange activities.

The **University of Aberdeen** is one of Scotland's leading universities with a global reputation for research in understanding and modelling the soil/microbe/plant interface, the population and physiological responses of animals and plants from diverse habitats to environmental change.

Scotland's Rural College undertakes internationally recognised research into crop and soils. The group is internationally known for its work on fungicide resistance in agricultural systems.