Our Research

Evolution of Dothistroma Needle Blight (DNB)

The current dramatic increase in DNB damage to pines in the northern hemisphere may be due to climate change and / or forest management driving evolution of a more virulent form the pathogen. Distinguishing between these situations is key to understanding and controlling the current threat from Dothistroma.

The experiment will use DNA sequencing to compare DNB populations in managed and unmanaged forest to see if human activity like fungicide use or planting of non-native trees has accelerated evolution of the pathogen. This work will integrate knowledge and genomic techniques developed in agriculture into forest pathology practice.

Researchers involved in Experiment 1 are:

Richard Ennos (Edinburgh University): rennos@ed.ac.uk

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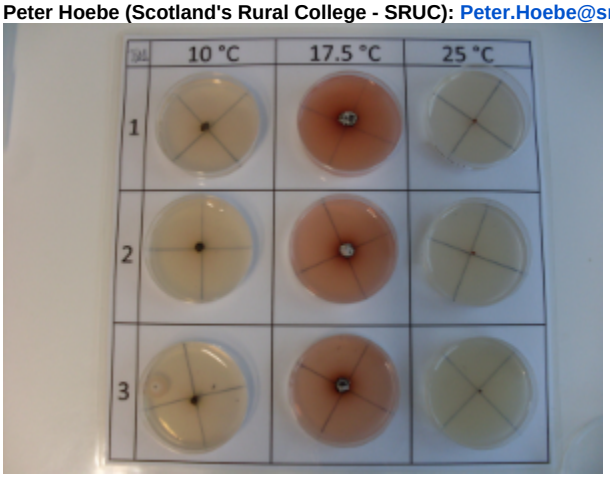

Photo: A. Perry

Variation in resistance to DNB in Scottish Scots pine

The fungus *Dothistroma needle blight* has emerged as a major threat to both exotic and indigenous pines, causing substantial damage to plantations. Since the 1960s a dramatic escalation in disease damage levels has been observed leading to death of trees in some stands. In Britain major disease outbreaks have occurred since the 1980s on exotic Corsican and lodgepole pine, and more recently Scots pine.

Researchers involved in Experiment 2 are:

Annika Perry (Centre for Ecology and Hydrology - CEH): annt@ceh.ac.uk

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Anna Brown (Forest Research): anna.brown@forestry.gsi.gov.uk

Photo: A. Perry

Variation in resistance to pine pitch canker in Scots pine

The fungus is highly virulent attacking *Pinus* species, causing pitch canker. Native to Mexico, it has spread into many of the major pine growing areas of the world and, in the early 21st Century, was discovered in southern Europe. It is arguably the most important pathogen of pine seedlings in nurseries, causing extensive mortality; mature trees may also die. Based on knowledge of spread of the pathogen to date, there is an extremely high risk that *F. circinatum* will spread further in Europe and Scots pine has proven highly susceptible to infection.

The researchers involved in Experiment 3 are:

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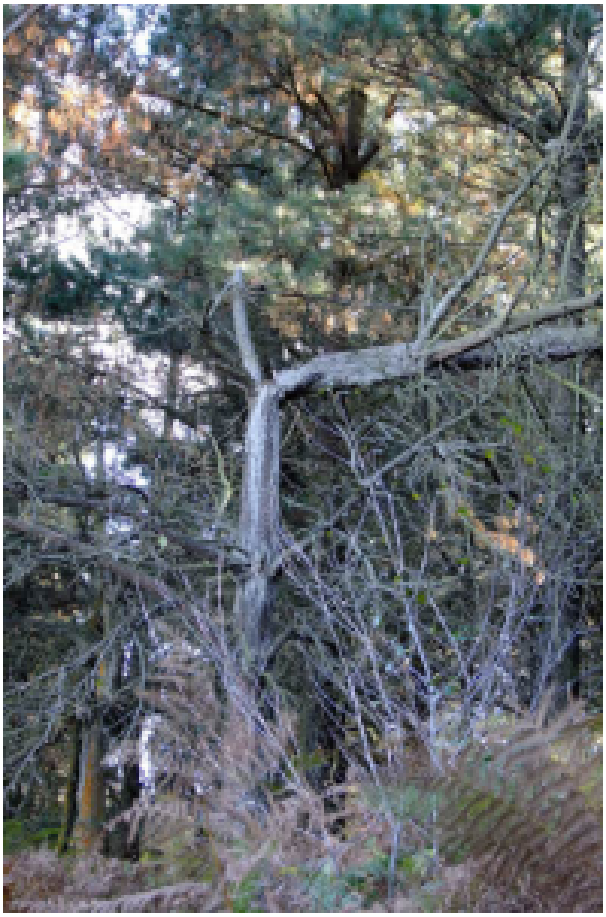

Photos: S. Woodward

Variation in resistance to Pine-tree lappet moth in Scots pine

The moth specialises on Scots pine trees, although it also uses other coniferous species. Its caterpillars can cause significant defoliation in some parts of its natural range and a breeding population was discovered in Scotland in 2009.

The researchers involved in Experiment 4 are:

Glenn Iason (James Hutton Institute): Glenn.Iason@hutton.ac.uk

Roger Moore (Forest Research): Roger.moore@forestry.gsi.gov.uk

Photos: R. Moore

Genetic diversity in Scottish Scots pine

This work will focus on measuring the genetic variation within Scots pine in Scotland, and identifying the parts of the environment that have shaped this evolution.

Local adaptation in native Scots pine

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The extended phenotype - role of microbes in disease susceptibility

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Modelling evolution in pine populations

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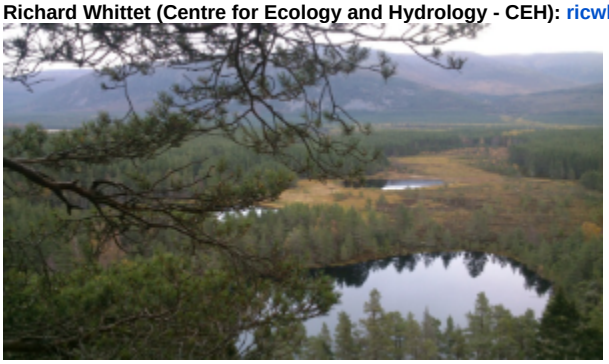

Photos: C. Riddell (top), A. Perry (bottom)