The James Hutton **Tracking** *Phytophthora* in natural ecosystems Institute

Summary

We have developed novel molecular diagnostics and water and soil sampling and DNA extraction protocols that have proven powerful tools to track plant pathogenic *Phytophthora* species.



Background

There are around 100 species of plant pathgogenic *Phytophthora*, many of which are highly destructive and cause serious losses to agriculture, horticulture and forestry as well as damaging plants in natural habitats. The presence of *P*. ramorum and P. kernoviae in Scotland is of current concern yet our understanding of the diversity and behaviour of most Phytophthora species in natural ecosystems is limited.

Application of these methods to a series of Scottish ecosystems has revealed a great diversity of species. This is opening up new opportunities to explore their role in nature and identify new threats emerging from, for example, climate change or invasive species.



Tarrry exudates on the bark of this *Alnus* are a sign of *Phytophthora* infection that will eventually kill the tree.

- The PCR-based method enables the sensitive and specific detection of *Phytophthora* rDNA sequences.
- A filtration protocol that traps the motile *Phytophthora* zoospores in water samples applied to three different river systems – Invergowrie Burn, Glensaugh and Sourhope with a DNA-extraction protocol are proving powerful tools for

processing environmental samples.

- Sequence analysis has revealed a wide range of species in undisturbed Scottish habitats and planted woodland. Sequences with no match to international databases indicate the presence of undescribed species.
- The methods have great potential for monitoring the spread of P. ramorum and P. kernoviae.

