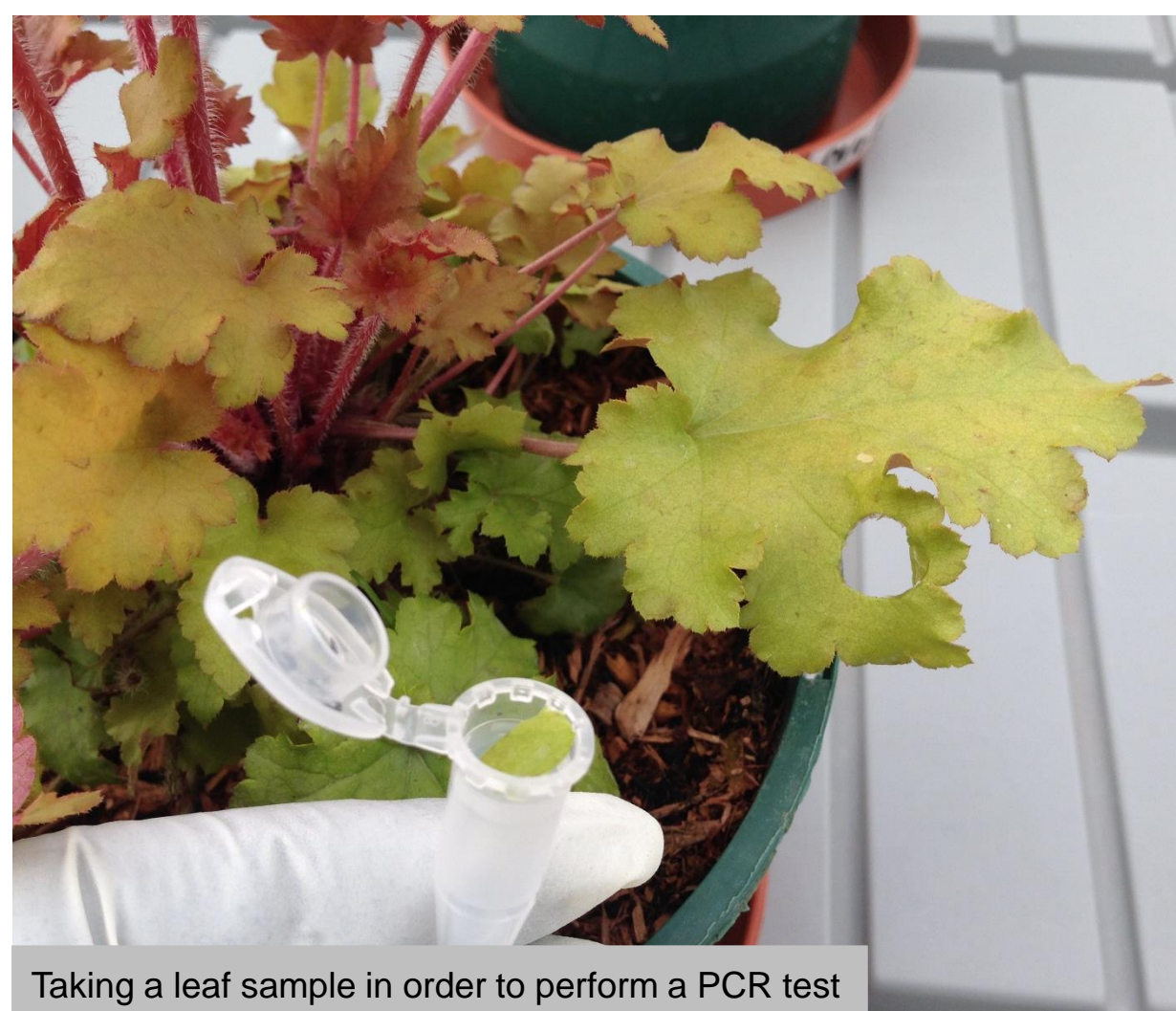


The epidemiology and control of heuchera rust (*Puccinia heucherae*)



Trial plants within HNS 191



Taking a leaf sample in order to perform a PCR test

Background

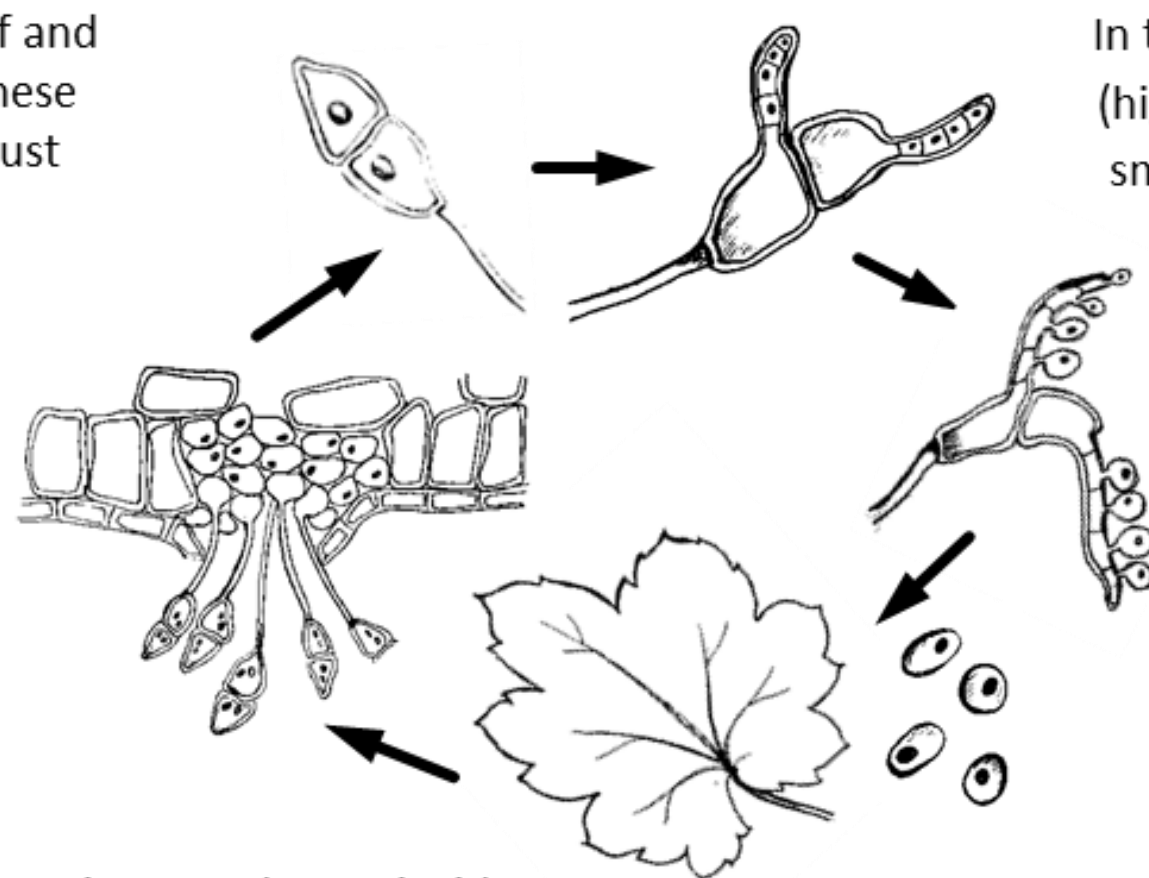
Heuchera rust, caused by the fungus *Puccinia heucherae*, was first found in UK gardens in 2004 and in nurseries in 2005. From 2010 to 2012, the incidence of the disease increased significantly.

In 2014, AHDB Horticulture funded ADAS and the RHS to undertake a project to improve the understanding of heuchera rust (*Puccinia heucherae*) and its origin and occurrence in the UK. Initially, a survey as part of HNS 191, found that UK growers have sought to manage the disease by minimising periods of leaf wetness, increasing ventilation in structures, removing older leaves, using preventative fungicide programmes and in some cases withdrawing susceptible varieties from the range grown.

A key issue for UK growers is where and when in the production cycle does the rust pathogen establish, and this poster details the work undertaken to address this.

Probable life cycle of *Puccinia heucherae*

P. heucherae grow within the leaf and produces stalked teliospores. These erupt through the leaf causing rust pustules.



In the correct environmental conditions (high humidity) the teliospores produce smaller infective spores, basidiospores.



Basidiospores land on the leaf, germinate and grow inside the leaf. This period is known as latent or non-symptomatic infection and can last for more than 5 weeks.

Current knowledge suggests that *P. heucherae* has no known alternate host and is thought to complete its life cycle on heuchera.

Methods

In 2014, samples of rust infected heuchera leaves were collected from nurseries. The identity of the rust was established through DNA sequencing and a molecular PCR test was developed to detect the rust on symptomless plants.

Heuchera plants were sampled through 2015 across five supply chains at various growth stages: seedlings, micro-propagated young plants, plugs/liners, retail plants and overwintered plants.

Plants were all visibly healthy on arrival and were tested for non-symptomatic rust infection using the molecular test.

Plants were then grown in a controlled environment glasshouse and outdoors with overhead irrigation and inspected weekly for subsequent development of rust symptoms.

Results

The current outbreak of rust on heuchera was confirmed as *Puccinia heucherae* through DNA sequencing.

No rust was detected in either micro-propagated plants or plug plants from four supply chains (*Heuchera* 'Marmalade') nor in seed-grown plants (*Heuchera* 'Palace purple') from a fifth supplier. These plants at the start of the supply chain are unlikely to be the source of heuchera rust infections.

Using the molecular test, rust was detected in four out of 36 symptomless overwintered heuchera ('Marmalade'), collected from one of two nurseries.

A symptomless overwintered plant developed a rust pustule on a leaf five weeks after quarantine in a glasshouse.

Action points for growers

- Aim to quarantine at least a sample of plants for a month after arrival.
- Regularly inspect foliage of all heuchera on the nursery for rust pustule formation.
- Avoid watering overhead, or if this is not possible, then water in the morning so that leaf surfaces dry out rapidly.
- Improve air circulation around plants to speed up leaf surface drying.
- If rust is seen, try to raise temperatures to above 21°C during the day, and 15°C at night to produce conditions less favourable to the pathogen.
- Adopt a suitable preventative fungicide programme, especially if there has been overhead irrigation, and/or periods of rain on outdoor plants.
- Remove old, senescing leaves from plants in autumn to help to prevent the pathogen from overwintering.
- Avoid growing susceptible varieties.