

## Introduction

In Europe many plant species belonging to the Moorland plants are important for landscape and garden cultures. *Rhododendron* is one of these plants and well known as a susceptible host for *Phytophthora ramorum*. Other important Moorland genera are *Calluna* (heather) and *Erica* (heath). Like *Rhododendron* these genera are produced in specialised nurseries. To date, just a single infection of a nursery plant of *Calluna vulgaris* in Poland has been reported and the plant species was added to the USDA APHIS associated host list (<http://www.aphis.usda.gov/ppq/ispm/sod/>).

In a first series of tests, the following questions were investigated:

1. Are *Calluna vulgaris* and *Erica gracilis* susceptible to *P. ramorum*?
2. Are there differences in susceptibility between cultivars?
3. Are there differences in the aggressiveness of *P. ramorum* isolates towards *Erica* and *Calluna*?
4. Does the inoculum (zoospores or mycelium) influence the infection rate?
5. Does the inoculation method (wounded/ not wounded) influence the infection rate?

The present study is part of the research project RAPRA (*Risk analysis for P. ramorum*, a recently recognised pathogen threat to Europe and cause of the Sudden Oak Death in the USA) funded by EU and is important for the estimation of the potential host range of *P. ramorum* in Europe.

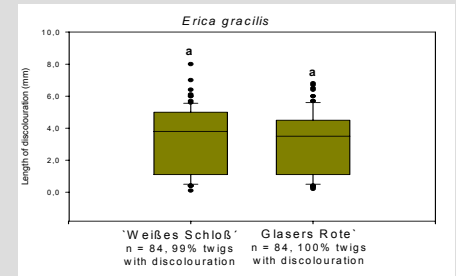
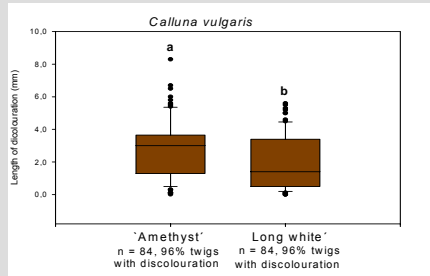
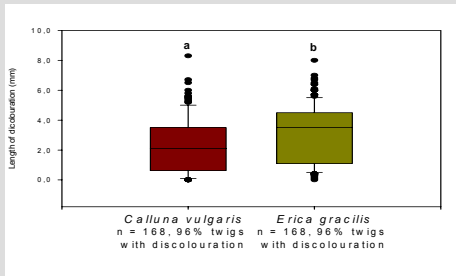
## Material and Methods

**Plant material:** Detached twigs of *Calluna vulgaris* ('Amethyst', 'Long White') and *Erica gracilis* ('Weißes Schloß', 'Glasers Rote'). **Isolates:** 3 European isolates (1376, isolated from *Viburnum tinus* "Eve Price", UK; 1577 isolated from *Rhododendron catawbiense*, Germany; 1578 isolated from *Rhododendron grandiflora*, UK) and one USA isolate (isolated from *Vaccinium ovatum*) were tested. **Cultivation:** on carrot piece agar (CPA 5%) at 20 °C with 16 hour white light for 14 days. **Inoculum: Zoospores:** Induction of zoospore release was achieved by flooding the colonies with 5 ml of sterile distilled water, incubation at +4 °C for one hour, followed by 60 min at room temperature. For negative control twigs sterile distilled water was taken. **Mycelium:** Mycelium plugs of 8 mm diam were taken from the edge of an actively growing colony. For the negative control, sterile CPA was used. **Inoculation: With zoospores:** Wounded (tips were cut just before inoculation) and not wounded twigs tips were dipped with the apical side into zoospore suspension for 5 sec. **With mycelium:** wounded twigs were pressed into a mycelium plug and placed on a wet sterile swab. **Incubation:** 6 days in a wet chamber at 20 °C with 16 h light. **Replication:** Seven twigs per trial were included. **Calculation of length of discoloration:** by measurement (mm). If discoloration developed in different areas of a single twig, only the length of the largest discoloration was measured. **Verification of the infection rate:** Through PCR amplification using specific ITS-Primer for *P. ramorum*: <http://www.bba.de/inst/g/pramorumeu/pramorumstart.pdf>. **Statistical calculation:** Kruskal-Wallis ANOVA on ranks with  $P \leq 0,05$  (SigmaStat, Jandel Scientific).

## Results

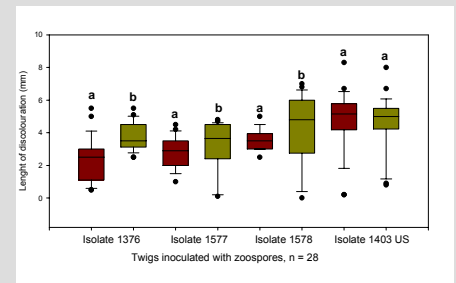
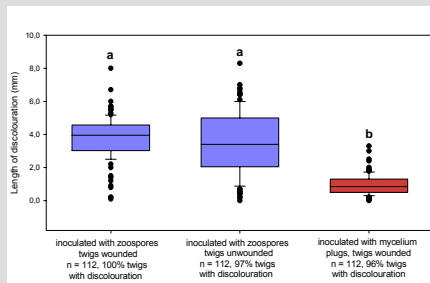
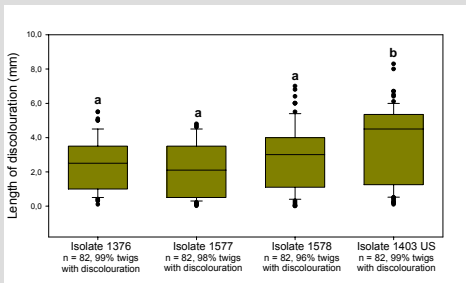
1. Both *Calluna vulgaris* and *Erica gracilis* could be infected with *P. ramorum*. 96% of the *Calluna* twigs and 99% of the *Erica* twigs showed discoloration. The length of discoloration was significantly longer on the *Erica* twigs.

2. Only the two cultivars of *Calluna vulgaris* showed significant differences in length of necrosis. The *Erica gracilis* cultivars expressed identical necrosis lengths.



3. The US-isolate 1403 (mating type A2) caused longer discoloration than the three European isolates (mating Type A1)

4. and 5. Infection, with zoospores and with mycelium caused discoloration. The length of discoloration was significantly higher with zoospore inoculation. Total inoculation with zoospores of wounded and non-wounded twigs resulted in non-significant differences in the length of necrosis. But there were differences between the isolates: European isolates caused longer discoloration in wounded than in non-wounded twigs.



## Summary

The preliminary tests indicate that *P. ramorum* isolates could infect *Calluna vulgaris* and *Erica gracilis*.

The length of discoloration of inoculated twigs from *E. gracilis* cultivars was longer compared to the *Calluna vulgaris* cultivars.

The infection occurs both with zoospores and with mycelium plugs, in unwounded and wounded plant material.

The experiments with unwounded plant material indicate that *P. ramorum* doesn't need an artificial wound to infect these two plant species.

The US-isolate seems to show a higher aggressiveness than the three European isolates.

The length of necrosis of wounded and unwounded twigs was different among the European isolates. For the US-isolate no differences were recorded between wounded and unwounded tissue.

Further tests are necessary to verify the differences between cultivars and isolates.