APPLIED PLANT RESEARCH
WAGENINGEN UR

Molecular detection of *Podosphaera mors-uvae,* causal agent of powdery mildew of gooseberry *(Ribes uva-crispa)*

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Introduction

The gooseberry *Ribes uva-crispa* (syn. *R. grossularia*) is a species of *Ribes*, native to Europe, northwestern Africa and southwestern Asia. Like the red currant (*Ribes rubrum*), the mountain currant (*Ribes alpinum*) and black currant (*Ribes nigrum*) it belongs to family *Grossulariaceae*. Several cultivars of gooseberry are selected for cultivation in the Netherlands, based amongst others on the sensitivity to powdery mildew and leaf spot disease.
The American gooseberry powdery mildew is caused by *Podosphaera mors-uvae* (formerly *Sphaerotheca mors-uvae*) and is the most important disease in gooseberry (Figure 1).

Figure 1: Symptoms of powdery mildew disease on fruit and stems of gooseberry.

American gooseberry mildew attacks gooseberry and black currants causing serious infections, leading to reduction in yield unless adequate (fungicide) protection is given. The fungus appears as a white powdery growth on the young leaves, stem surfaces and berries. Powdery mildew infections may result in a significant reduction in marketable fruits. Fungicides to control mildew are generally applied routinely from early season until end of the shoot growing period. To prevent the spread of this pathogen, especially the introduction of potentially new races, an efficient method for early detection of *Podosphaera mors-uvae* in gooseberry samples is required.

Molecular characterization

In this study, the Internal Transcribed Spacer sequence of ribosomal DNA of *Podosphaera mors-uvae* was determined and compared with several sequences of *Podosphaera* species in the GenBank. The sequence of this fungus was submitted to Genbank (Accession No. GU815243).

Results

A specific polymerase chain reaction (PCR) test was developed to detect this pathogen in symptomatic and asymptomatic gooseberry plant parts (Figure 2).

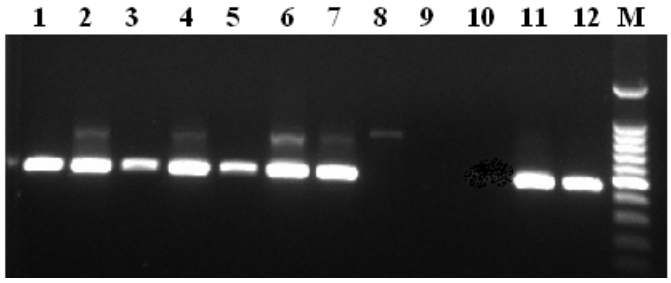

Figure 2: PCR products amplified with specific primers for *Podosphaera mors-uvae.* Lane 1, 2, 4, 6 and 7: gooseberry plant parts with symptoms; lane 3, 5: gooseberry plant parts without symptoms; lane 8, 9: healthy gooseberry; lane 10: water (negative control); lane 11, 12: positive controls); M: 100bp Ladder (Promega).

The phylogenetic analysis showed that *Podosphaera mors-uvae* is closely related to *Podosphaera pannosa, P. fugax and P. negeri,* the powdery mildew fungi on members of Rose, Geranium and Escallonia, respectively (Figure 3). The PCR test proved to be specific and sensitive for identification detection of *Podosphaera mors-uvae* in gooseberry samples.

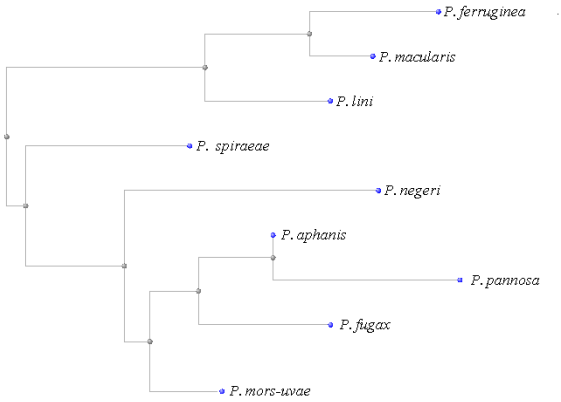

Figure 3: Phylogenetic tree derived from analysis of ITS sequences of *Podosphaera mors-uvae* and related *Podosphaera spp.*

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