

Grower Summary

FV 403

The potential of the
coriander bacterial blight
pathogen to infect
parsley

Final 2012

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Further information

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Headline

UK strains of the coriander bacterial blight pathogen, *Pseudomonas syringae* pv. *coriandricola*, have been confirmed as being able to infect and cause leaf spots on parsley.

Background and objectives

Parsley and coriander are at present the two most important herb crops in the UK, both as field-grown and protected crops. Bacterial blight, caused by *Pseudomonas syringae* pv. *coriandricola* (*Psc*), is the most important disease of coriander. The pathogen is seed-borne and HDC project FV 318 established the importance of and set seed health tolerance standards for seed-borne infection.

A recent scientific paper from the USA (Bull *et al.* 2011) suggested that the seed-borne coriander bacterial blight pathogen (*Psc*) is able to infect not only coriander but also parsley and celery. These results contradict earlier studies done in Germany (Toben *et al.* 1996) indicating that *Psc* is not a pathogen of parsley or celery. Until now, there has been no reason to doubt these earlier studies and they were used as the basis for information provided in HDC factsheet 16/10, on coriander bacterial blight.

As *Psc* is seed-borne, and coriander and parsley are often grown in close proximity (i.e. in the same field or glasshouse), there would be a significant risk if a pathogen was able to infect both hosts. This potential for cross-infection, if confirmed, could have considerable implications for epidemiology and bacterial disease control. On the other hand, if the US report is correct, it is surprising that there have been no reports of bacterial disease in UK parsley crops, bringing the validity of the US work into question and warranting further verification.

This project aimed to verify US findings using recent and historical UK strains of *Pseudomonas syringae* pv. *coriandricola* and thereby clarify the potential for the seed-borne coriander pathogen to infect parsley.

Summary

Parsley and coriander plants were raised from seed in a glasshouse and inoculated with ten different isolates of *Psc*. These isolates were obtained from coriander leaves, stems and seed in the UK between 1967 and 2011, plus the type strain of the pathogen isolated in Germany in 1990. The majority of the UK isolates (six out of nine), plus the type strain from Germany, were pathogenic on both coriander and parsley, producing typical bacterial disease symptoms of dark water-soaked lesions on the leaves of both hosts (Figure 1).



Figure 1. Typical disease symptoms on parsley (left) and coriander (right) 16 days after inoculation with *Pseudomonas syringae* pv. *coriandricola*.

This confirms recent results obtained by workers in the USA (Bull *et al.*, 2011), and contradicts earlier work from Germany (Toben & Rudolph, 1996). The results have important implications for herb growers because of the proximity in which the two species are often grown in commercial practice. *Psc* is seed-borne, and HDC project FV 318 showed that infestation of coriander seed lots with *Psc* is relatively common. The difficulties of controlling bacterial diseases together with the potential for cross-infection means that it is now even more important to ensure the health status of coriander seed to prevent introduction of inoculum. Furthermore, since there has never been any testing of parsley seed for the presence of *Psc*, it is not known whether *Psc* can be carried in parsley seed or transmitted from seed to seedling. Parsley seed may therefore also present a risk for coriander crops, so growers / seed companies should consider testing parsley seed for the presence of *Psc*.

The work done in the USA was motivated by the frequent isolation of *Pseudomonas syringae* bacteria from disease outbreaks in parsley in California. It seems curious that despite the prevalence of *Psc* in coriander seed, there have been no reports of bacterial disease in parsley in the UK. One possibility is that this is a result of misdiagnosis: the most common disease in parsley is considered to be a fungal leaf spot caused by *Septoria petroselinii*; it is possible that, in the absence of laboratory diagnosis, bacterial leaf spots on parsley have been assumed to be caused by *Septoria*, when they were in fact caused by *Psc*. This could

account for some reports of difficulties in controlling *Septoria* and emphasises the need for laboratory investigation of new or unusual disease symptoms.

There were indications that isolates were less aggressive on parsley than on coriander, and that parsley stems or petioles may be less susceptible to infection than leaves. If proven correct, it is possible that these preliminary observations of differences in tissue susceptibility could lead to differences in the epidemiology of the pathogen in the different hosts. This and possibly other factors that result in relatively reduced 'fitness' of *Psc* on parsley compared to coriander under UK conditions could also provide an alternative explanation of the lack of reports of disease on parsley in the UK.

A few isolates from coriander produced weak or no reactions on parsley. These isolates were also less aggressive on coriander than other isolates. It is possible that this could be indicative of some degree of race specificity, but as these also tended to be older isolates, it is possible that they have lost some pathogenicity during repeated sub-culturing.

Further work would be needed to quantify the relative aggressiveness and 'fitness' of isolates on the two hosts under different conditions and devise and validate seed test methods for the pathogen in parsley.

Financial benefits

Parsley and coriander are the two most important field grown herbs. The project has provided information for determining disease management strategies in these crops and will be used to update HDC factsheet 16/10.

Action points for growers

- Be aware of the potential for cross-infection between parsley and coriander.
- Inspect parsley crops for signs of bacterial disease.
- Do not assume that all leaf spots on parsley are caused by *Septoria petroselini*.
- Ensure that coriander seed has been tested and found free from infestation with *Psc* according to the standards recommended in FV 318.
- Consider having parsley seed tested for *Pseudomonas syringae* pv. *coriandricola* as well as *Septoria petroselini*.