

The monitoring of GB blight outbreaks: mating type and genetic fingerprint analysis

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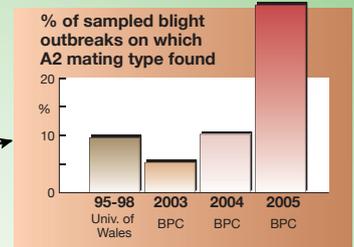


Background

There are two mating types of the late blight pathogen *Phytophthora infestans* (A1 and A2) that can generate sexual oospores if present together in a diseased crop. Surveys of *P. infestans* in GB crops over recent years have shown an increase in the frequency of the A2 mating type.

Such changes are a potential threat as:

- Soil-borne oospores are long-lived and may result in earlier disease
- Genetic recombination improves the pathogen's ability to adapt to control measures



This BPC-funded project will gather more detailed information on GB blight outbreaks. It runs alongside the BPC 'Fight Against Blight' (FAB) campaign with more intensive

sampling, genetic fingerprinting and studies on oospore formation under GB conditions. At the end of each season data will be collated on the likely origins

of each outbreak and the GB industry kept informed of any increased risk of oospore inoculum.

Project outline

BPC FAB scout network

- Monitoring GB crops for blight outbreaks

8 samples per outbreak

CSL

- Confirmation
- Mapping outbreaks
- Provide SCRI with samples

UPDATE...
110 OUTBREAKS SAMPLED
900 ISOLATES BEING EXAMINED

Airborne infection

Single fingerprint
Single mating type

A1	■

- Earliest signs: lesions on upper canopy scattered across crop
- A single mating type and genetic fingerprint in each patch suggests one or more sources of inoculum such as a nearby crop

Seed-borne infection

Single fingerprint
Single mating type

A1	■

- Earliest signs: Isolated single infected plants; disease developing on the lower canopy first, perhaps with stem lesions.
- A single mating type and genetic fingerprint on each plant suggests a single source of inoculum such as disease in the seed crop

Oospore infection

Many fingerprints
Both mating type

A1	■	■
A2	■	■
A2	■	■
A1	■	■
A1	■	■
A2	■	■
A1	■	■
A1	■	■
A2	■	■
A2	■	■

- Earliest signs: Localised severe disease; maybe early in Season; developing on the lower canopy first
- A mixture of mating types and many different genetic fingerprints is strong evidence of oospore-borne infection

SRT

- Examining oospore production and survival under GB conditions

SCRI

- Isolation onto agar
- Mating type testing
- SSR fingerprinting

Genetic fingerprinting and outbreak data are being used to examine primary inoculum sources; especially if the blight outbreak is sampled in the early stages of infection.

Interpretation (all partners)

- A1:A2 frequency and distribution
- Genetic diversity
- Data on each outbreak to understand primary inoculum source (see box)
- Identify trends and assess risk of A2 mating type to GB industry