WAGENINGEN UNIVERSITY & RESEARCH

Certis Belchim GROWING TOGETHER

AARHUS UNIVERSITY

The James Hutton Institute

+?

+?...

United against Potato late blight: The power of working together on phenotyping

Presentors:

David Cooke (James Hutton Institute)

Lawrence Veryser (Certis Belchim)

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The potato working group initiative

Going from a reactive approach
to
A proactive predictive approach

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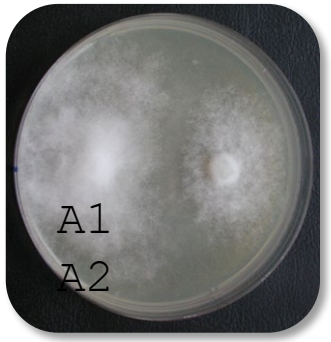
Key Traits

- Population study
- Virulence
- Fungicide sensitivity and response
- Aggressiveness and fitness
- Linking above to biology, genetics, epigenetics and genome evolution



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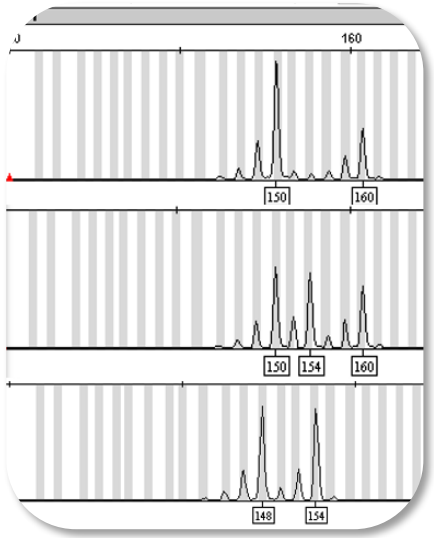
Genotyping



- FTA cards or isolates
- SSR fingerprinting and collation of data
- Rapid identification of damaging clones (or populations?)

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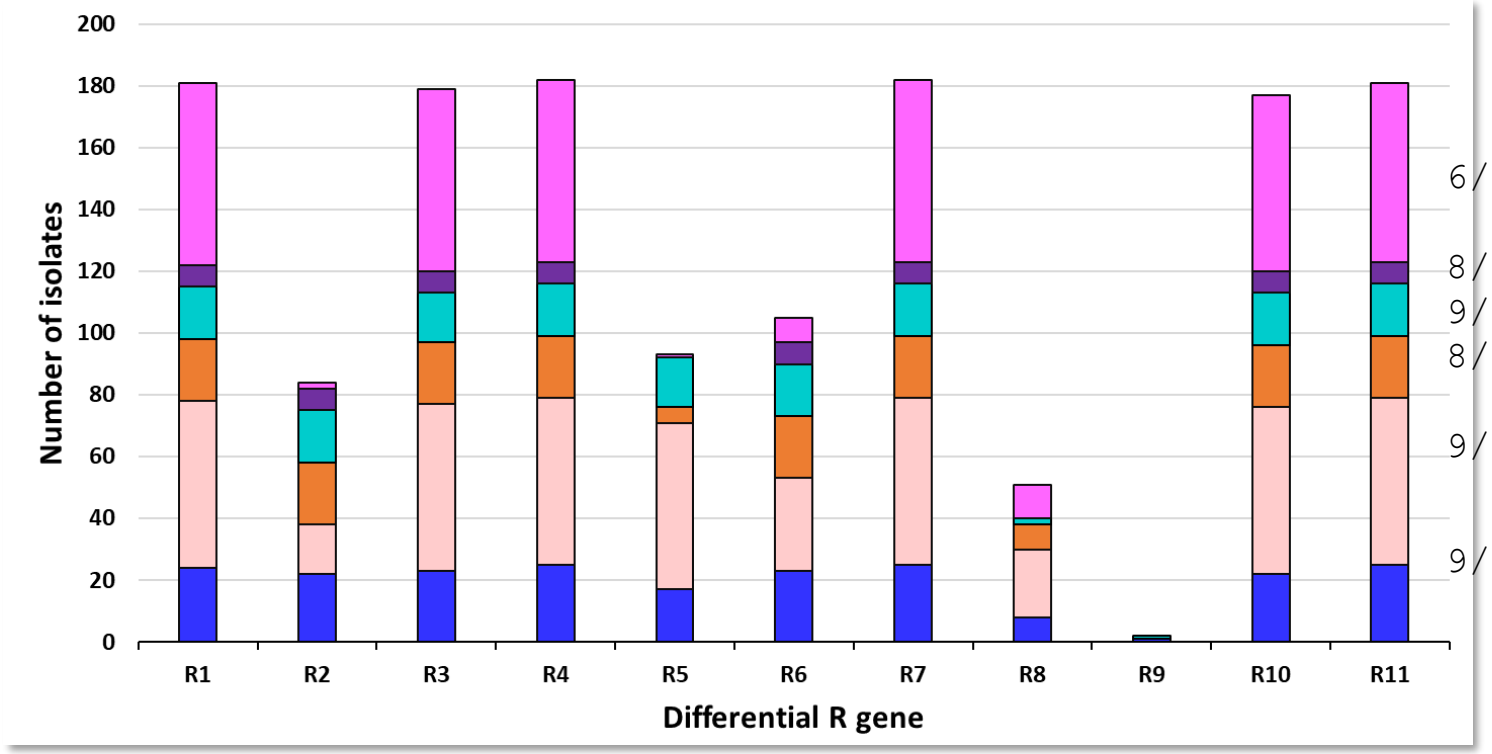
Virulence



- 180 isolates of known lineages tested
- Black's differentials show clone-specific patterns of virulence
- Many other known R genes now deployed; singly or in combinations
- Detached leaf, whole plant or nursery plot field tests?
- DNA-based Renseq & Penseq NLR and RXLR sequences of commercial cultivars and *P. infestans* helps

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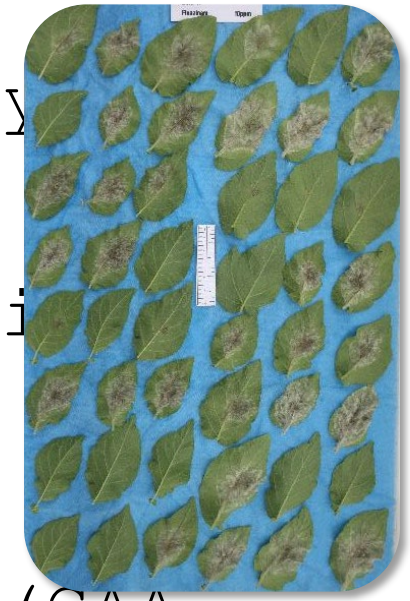
Scottish Government
Riaghaltas na h-Alba
gov.scot

James Lynott & Alison Lees

Fungicide sensitivity

- FRAC standardise assays and report annually
- Leaf disk, detached leaf, whole plant or fi tests
- DNA-based assays possible for some groups (CAA, OSBPI)
- Rapid and earlier reporting allows prompt co-ordinated action



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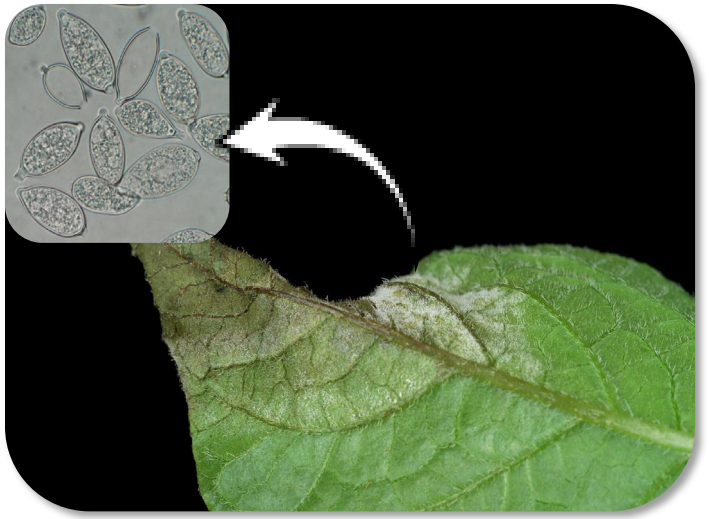
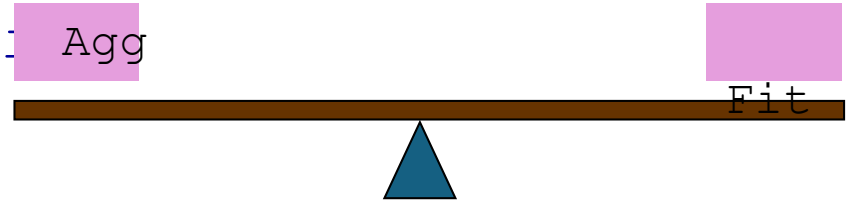
Fitness and aggressiveness

- Aggressiveness – amount of damage caused to leaves, stems or tubers

- Fitness – disease spread within (sporangia and zoospores) and between (tubers or oospores) seasons
  - Latent period
  - Lesion size
  - Sporulation capacity



- Environmental response – temperature and humidi



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Being part of the evolutionary arms race

- **Characterizing a problematic population**
  - Resistance phenotype? → Hypersensitive phenotype?
  - Aggressiveness Low/High? Do certain practices reduce selection towards aggressiveness?
    - elicitors? cultivars? weather conditions?
  - Virulence, which R genes to recommend in locations?
  - Genetics. Does the genetics give a starting point for research?
    - Ploidy levels
    - Relationship/parentage and similarities amongst genotypes?

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Efficient problem detection and response development

1. **Identifying a potential problem**
2. **Localizing where the problem is occuring**
3. **Learning about the problem, what would be an appropriate response?**
4. **Testing the response**
5. **Reevaluating the populations**

- **more efficiency, minimizing damage!**

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Goals of the group

"Get a better understanding, by collecting and sharing scientific knowledge, of potato Late Blight, in order to control the disease in a sustainable way"

Each member of the group, with its own PLB expertise, has a piece of the puzzle (=solution).

By working together, we can offer a stronger, more sustainable, solution to the potato growers.

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Potato late blight working group

Working together to phenotype and combat problematic late blight strains

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Virulence	Fungicide resistance	Aggressiveness	Genotype	?	?...

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