Research on Integrated Pest Management (IPM) for potato

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Scottish Government
Riaghaltas na h-Alba
gov.scot

AHDB
POTATOES

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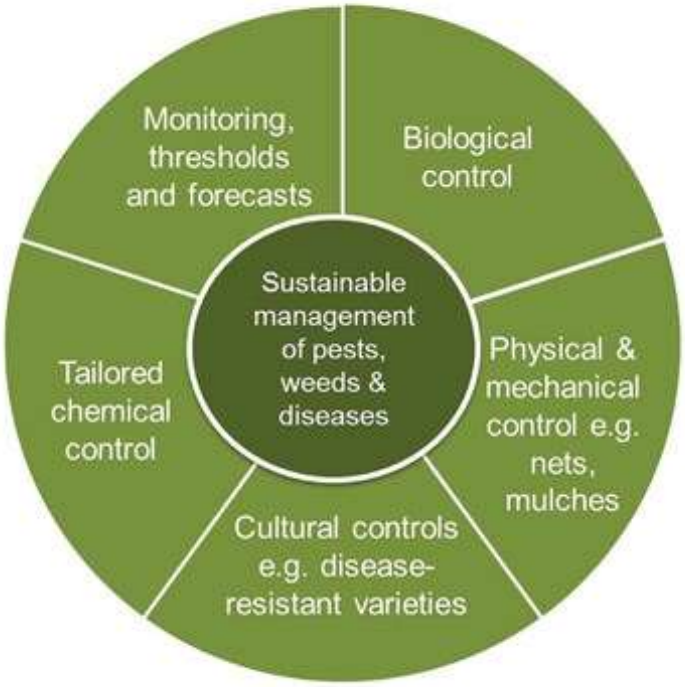
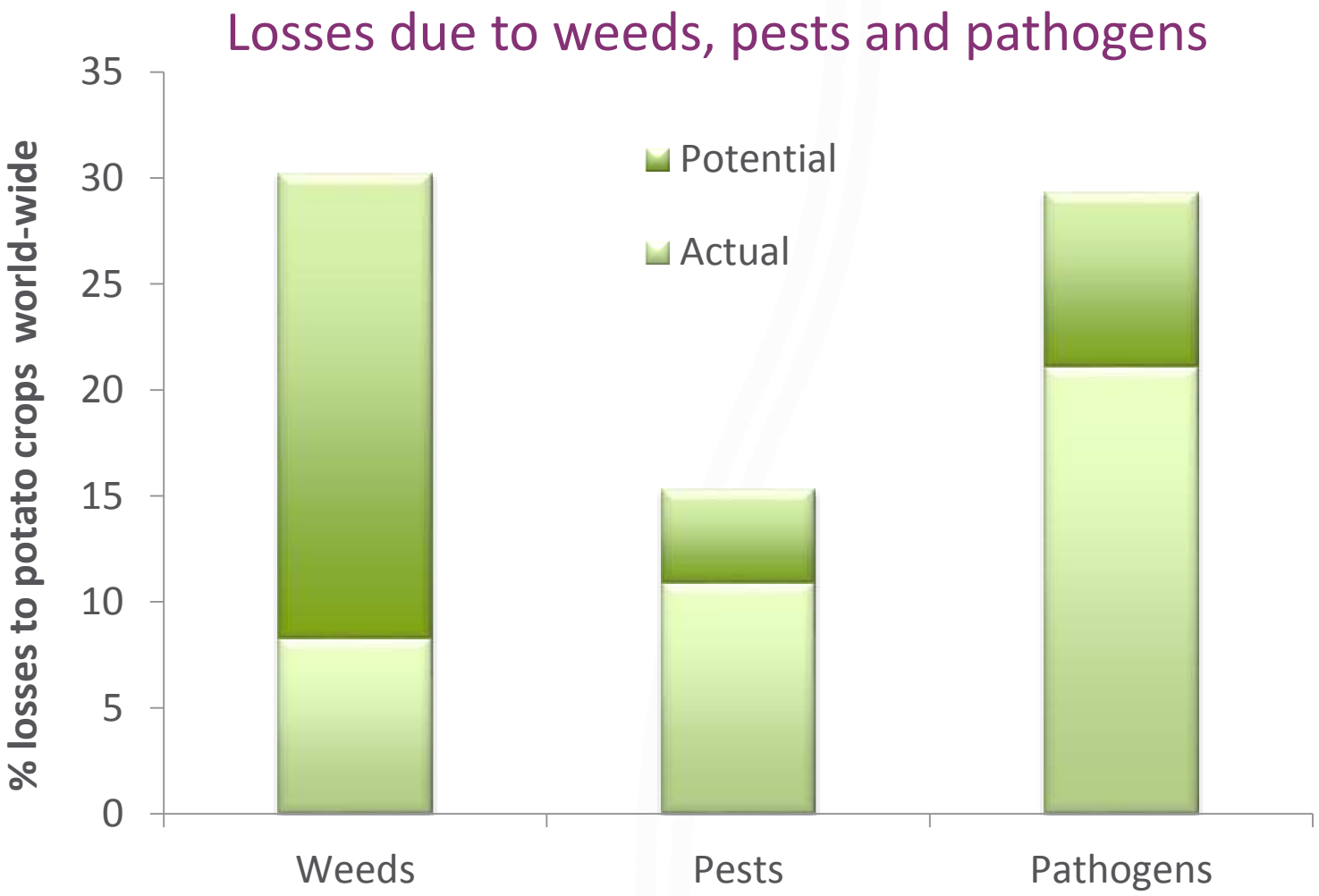
What is IPM?

Integrated pest [and disease] management (IPM) is the coordinated use of complimentary methods to suppress pests, weeds and diseases and reduce environmental risks.



http://www.gov.scot/Topics/farmingrural/Agriculture/Environment/Pesticides/IntegratedPestManagement

Why do we need IPM?



E C Oerke: Journal of Agricultural Science (2006)

IPM@Hutton

http://ipm.hutton.ac.uk/

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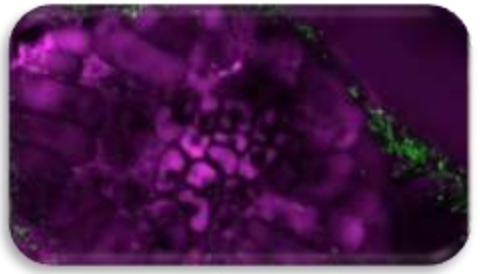
Crop protectants & Biopesticides

Biocontrol

Biodiversity

Landscape Management

Pest & Disease Resistance



Detection & Monitoring

Pollinators

Rotations & Crop Diversity

Weed Management

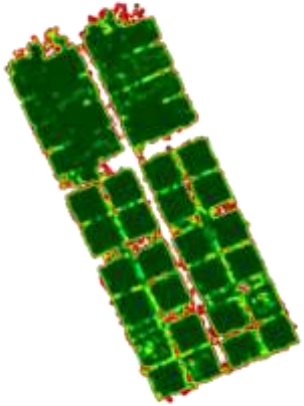
IPM strategies

Blackleg disease

Late blight

Soil-borne pathogens

FLN



New technologies

IPM strategies for blackleg disease

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Ventilated storage

Seed certification

Good hygiene

Safe Haven scheme

Field rotations

Improved classification and diagnostics

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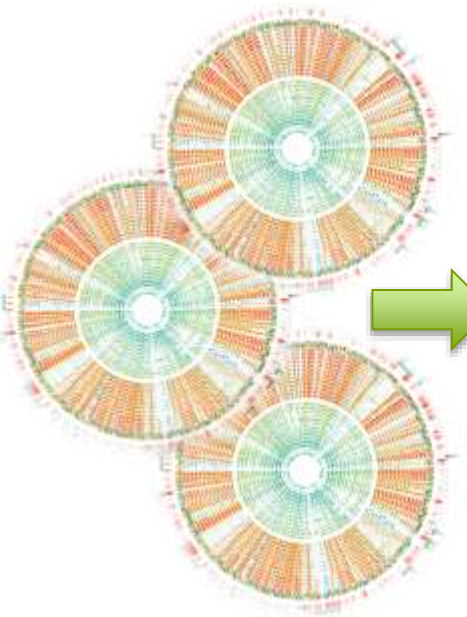
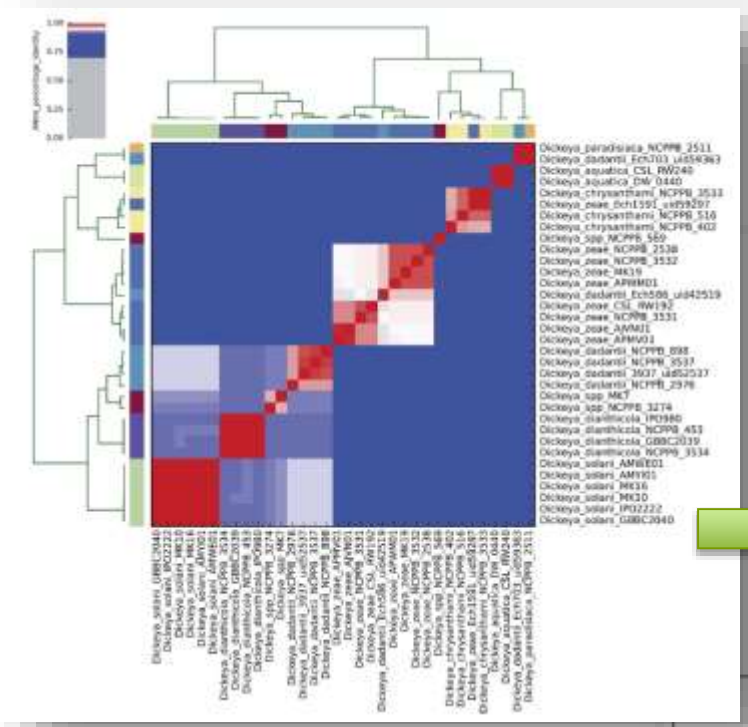
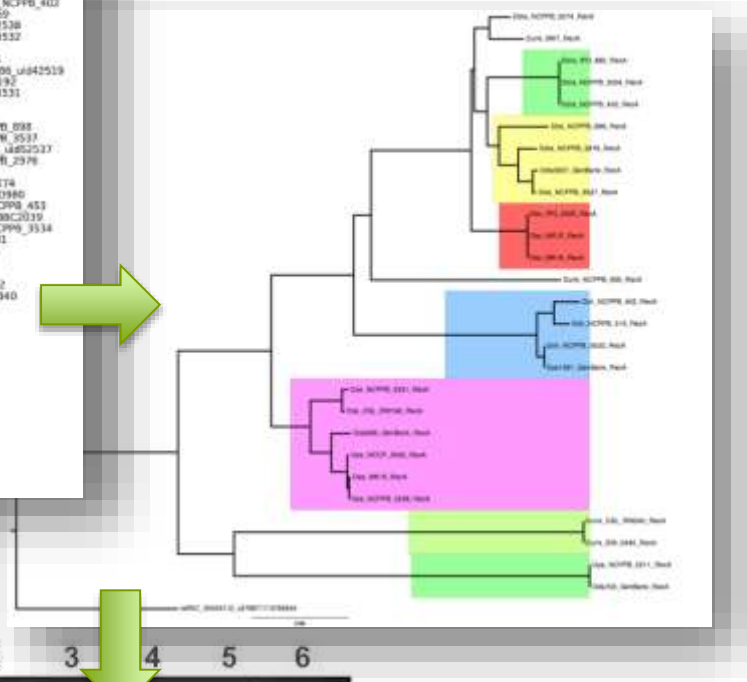
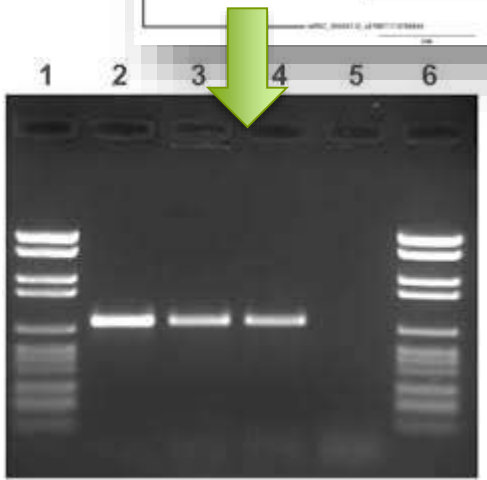






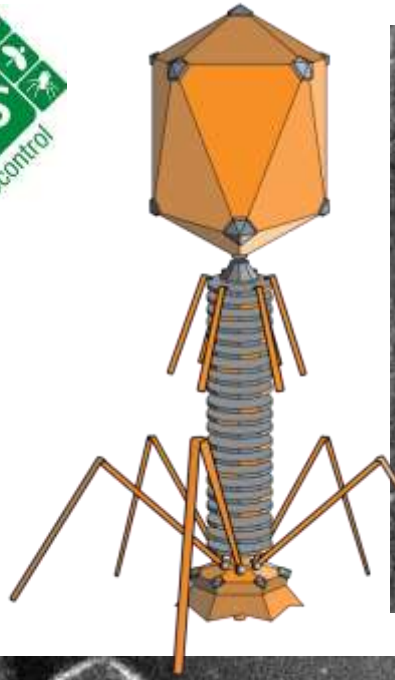


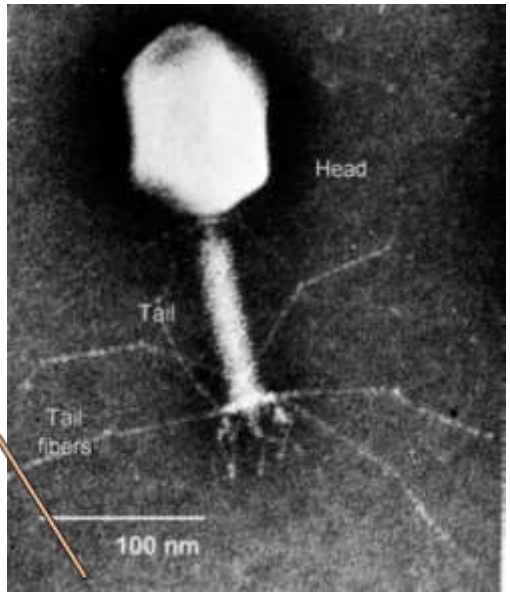
Leighton Pritchard

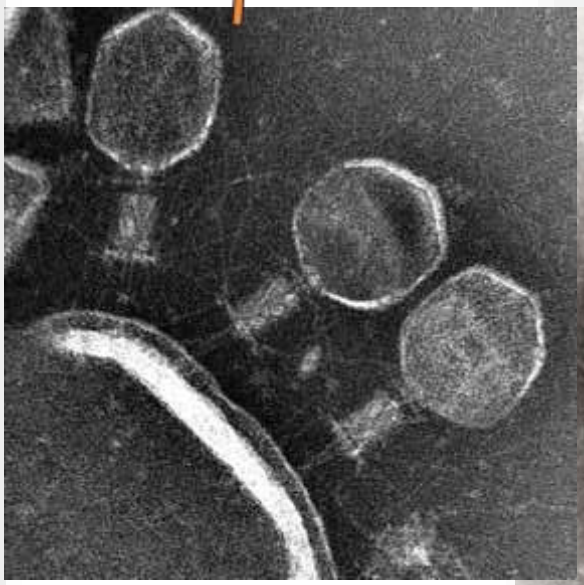
Disease resistance / tolerance

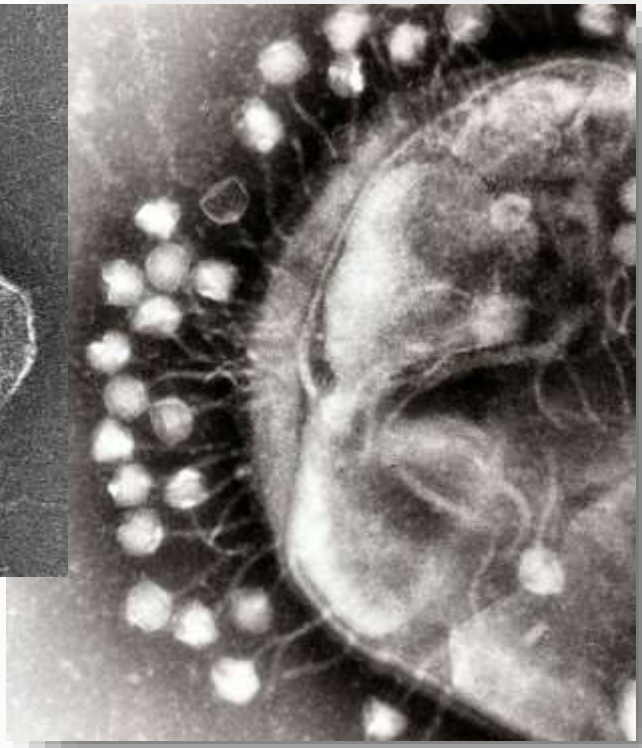
Biocontrol

Field trials



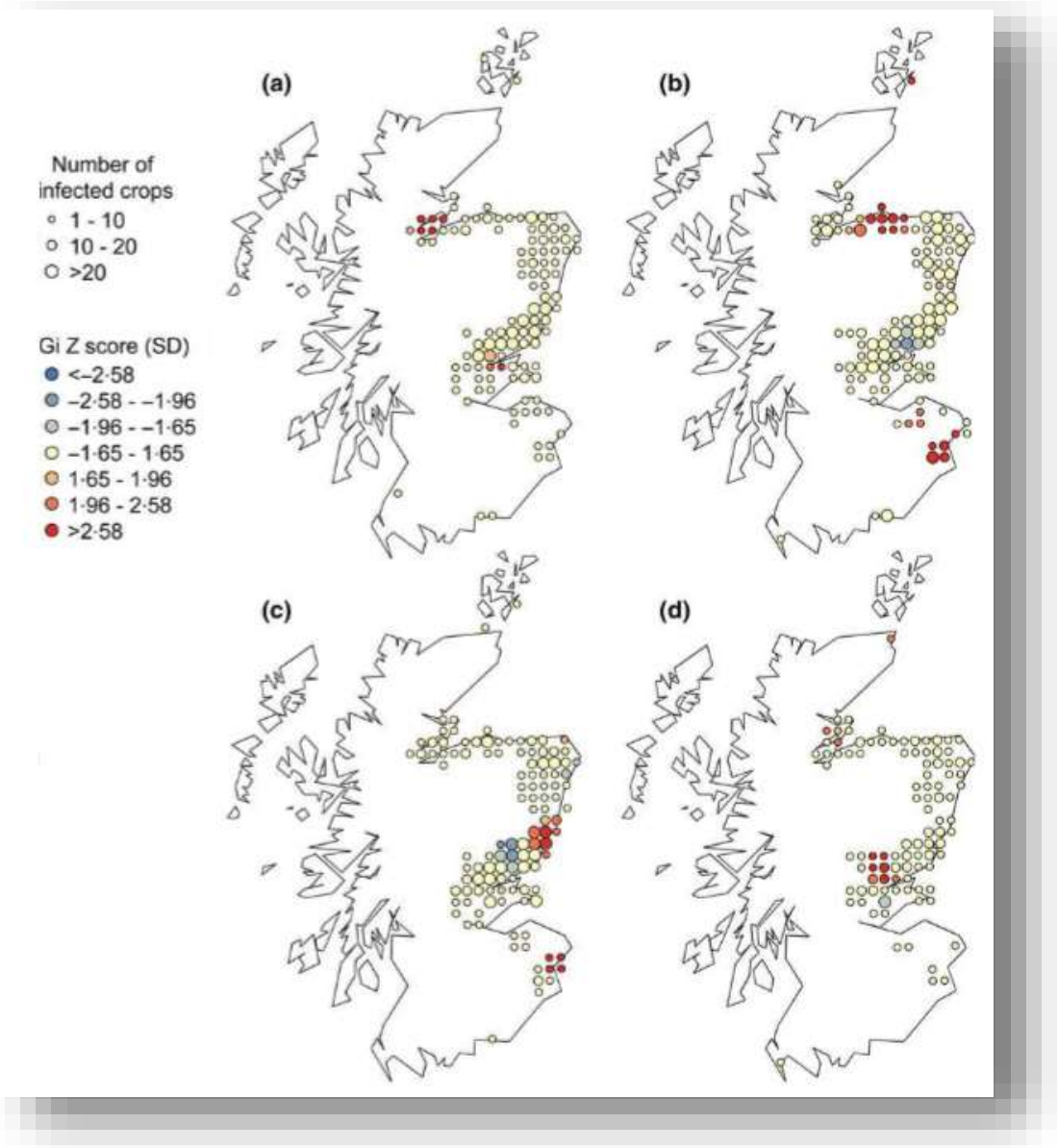






Bacteriophages

Disease forecasting and management



Pete Skelsey

IPM strategies for Late blight

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‘Fight Against Blight’ campaign

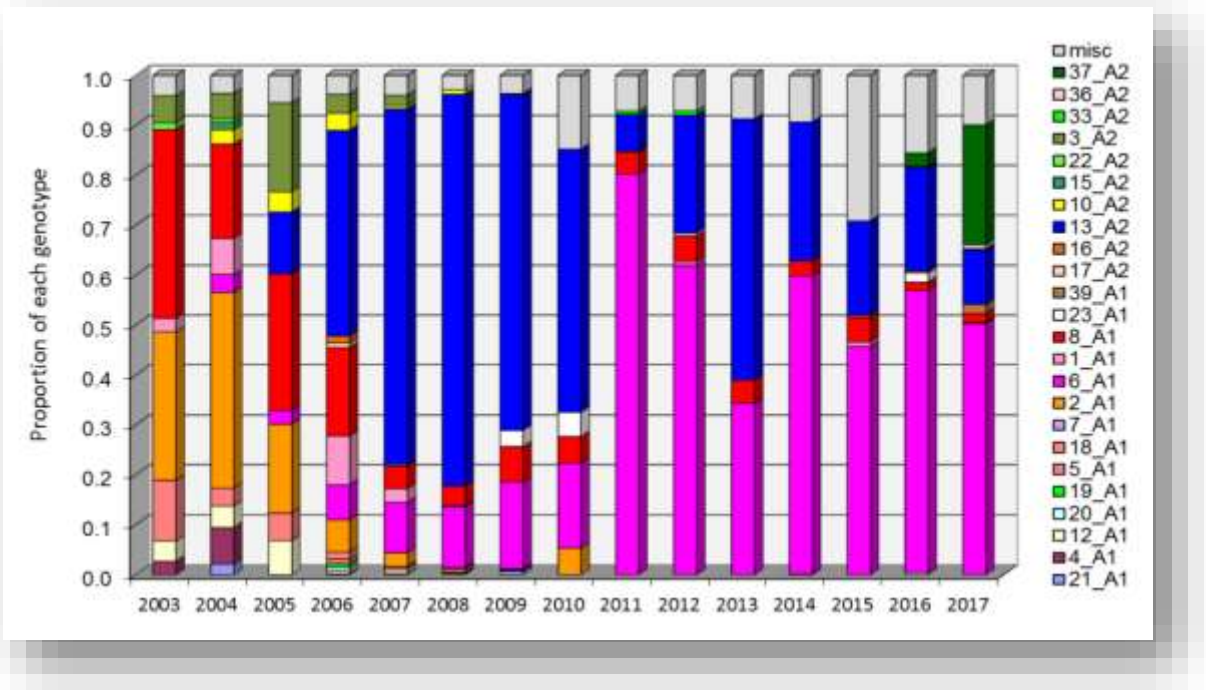
AHDB POTATOES

- Scouts monitor and report blight around the UK
- Outbreak alerts sent to growers
- *P. infestans* samples collected

Understanding pathogen populations

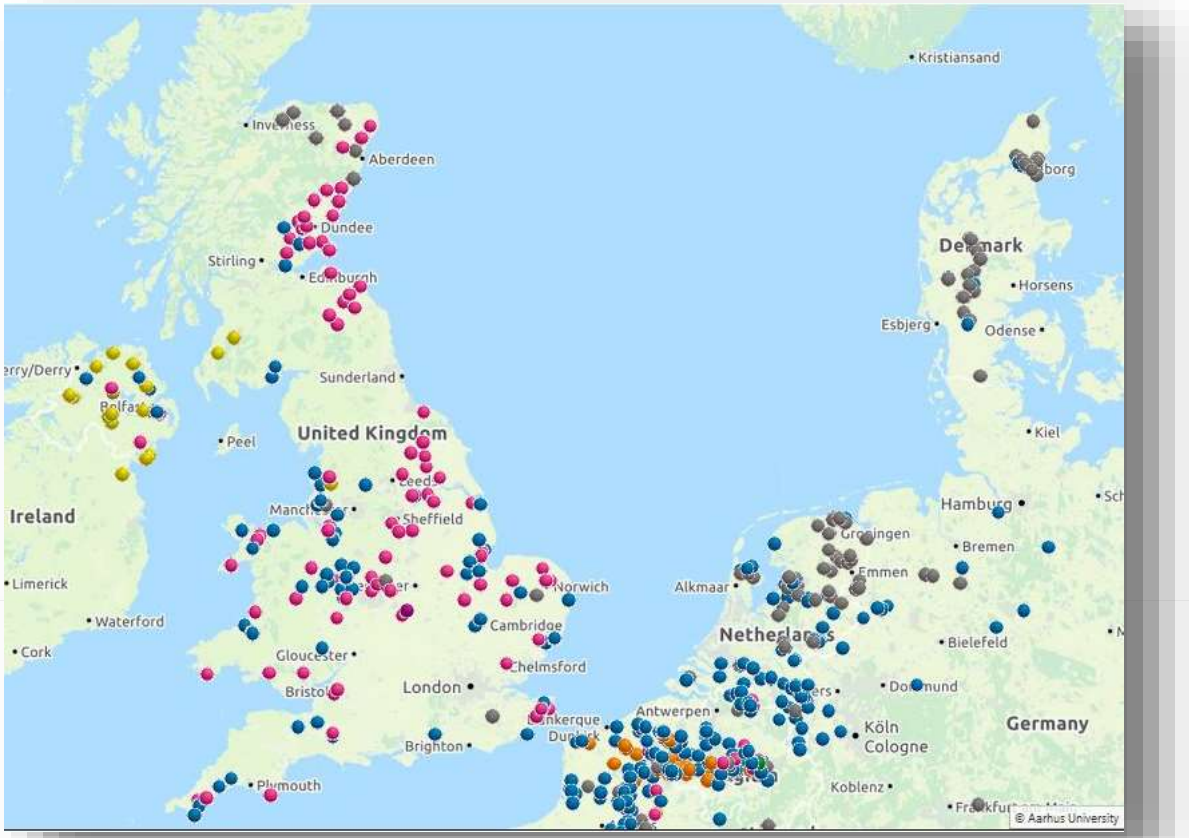
Samples genotyped and associated with phenotype to inform growers on:

- Aggressive lineages
- Fungicide resistance and advice on their use
- Host resistance (breeders using 13_A2 and 6_A1 for selection)



European monitoring (Euroblight)

- Euroblight offers a wider perspective
- Identifies the emergence of lineages
- Improves efficiency of control measures



Hutton criteria vs Smith period

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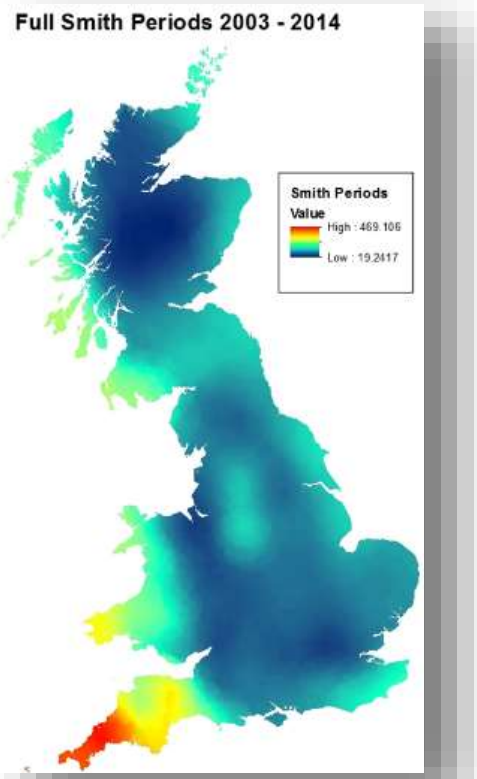
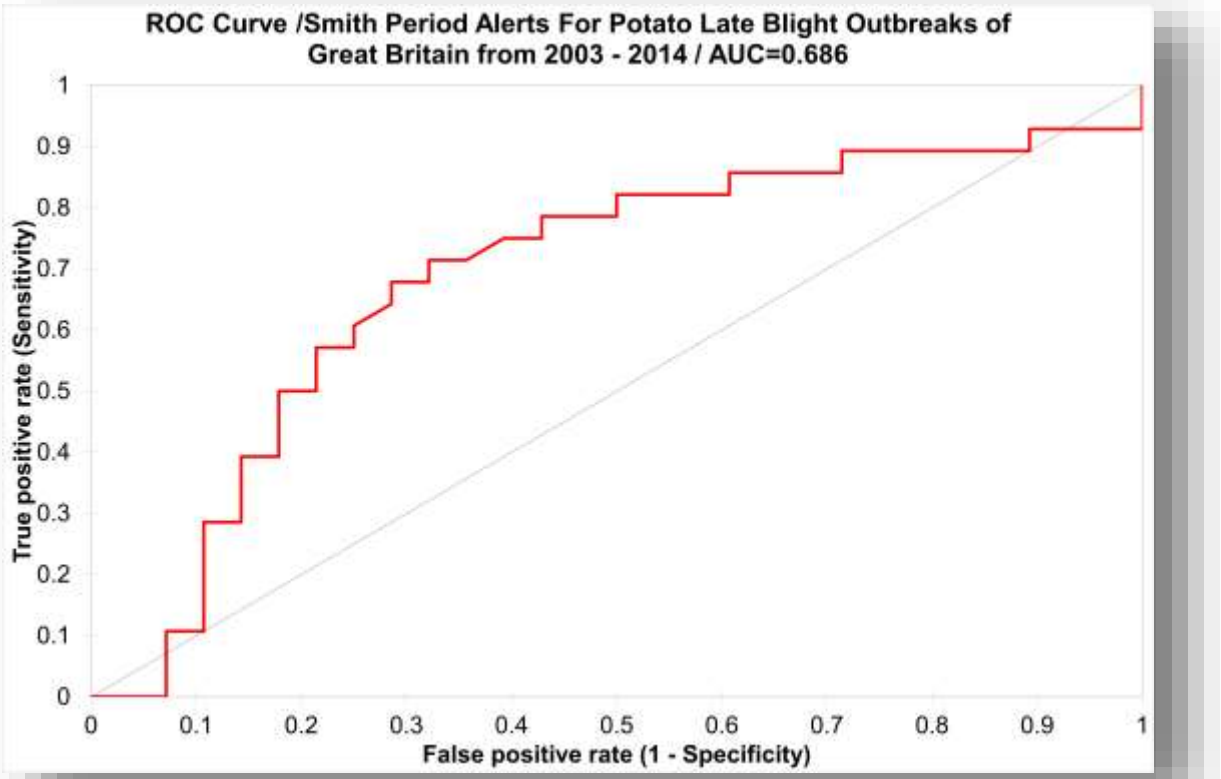
Two consecutive days where:

- Each day has a **minimum temperature of 10°C**
- Each day has at least **11 hours (Smith) or 6 hours (Hutton) of relative humidity ≥ 90%**





Sustainable fungicide programme at CSC

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Hutton criteria is being used to test a ’sustainable’ fungicide programme at the Centre for Sustainable Cropping (CSC)

IPM strategies for soil-borne pathogens

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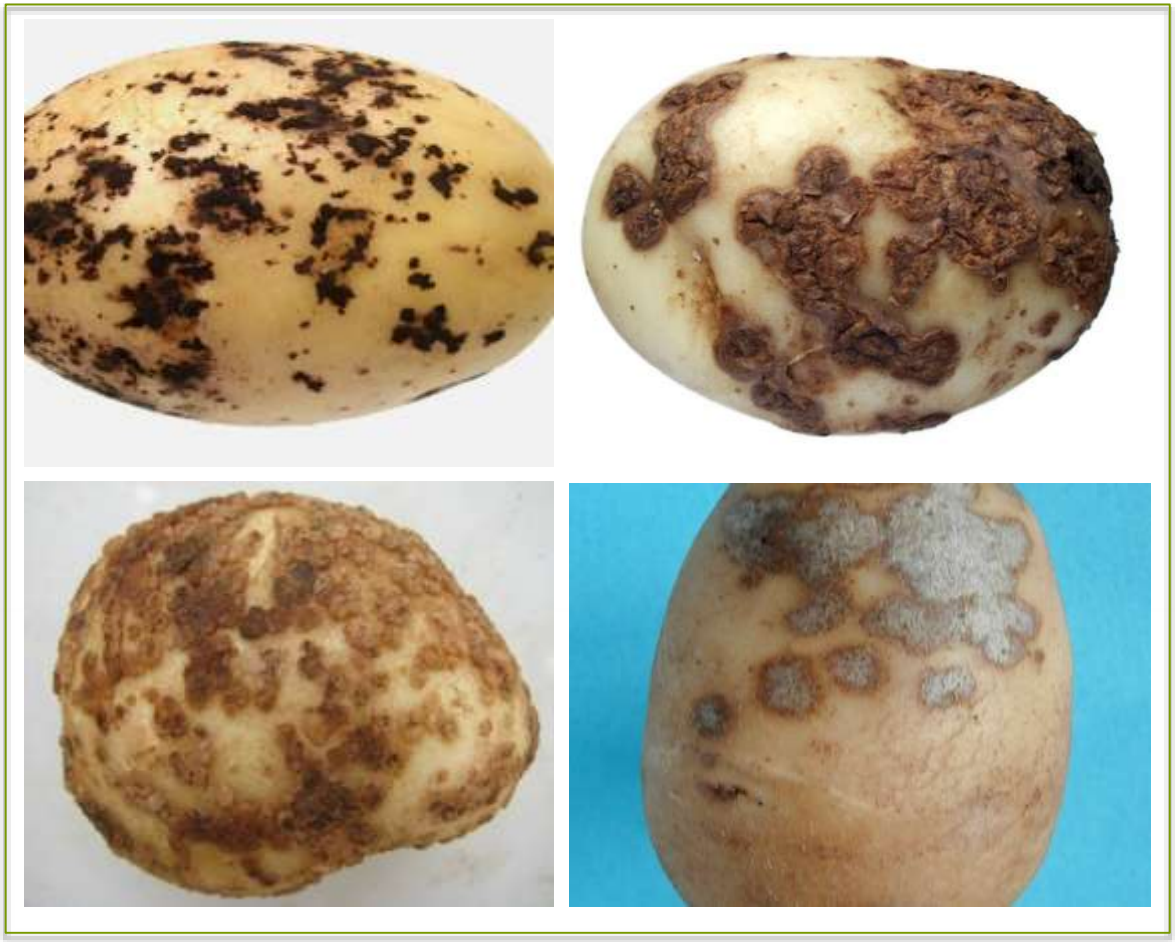
Soil-borne pathogens cause serious blemish diseases

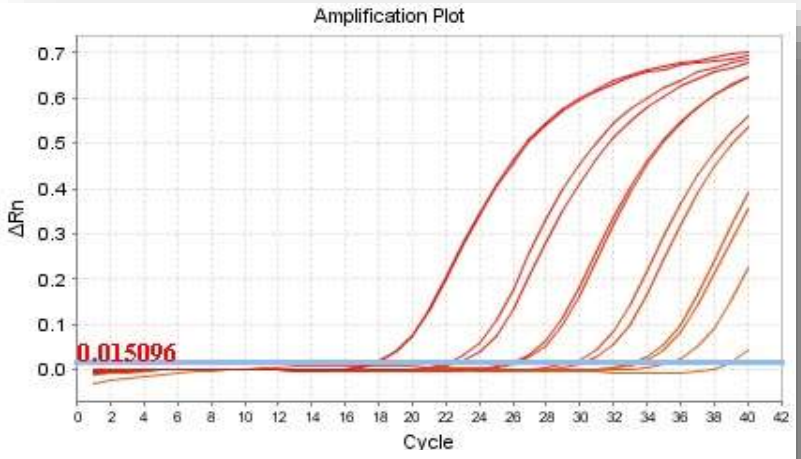


Evaluating disease risk

1

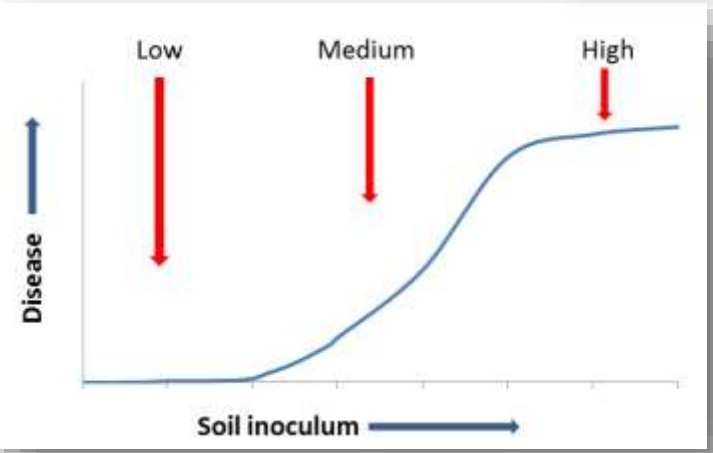
Soil sample (pre-planting)

2



Quantification of target inoculum

3



Relating inoculum to disease risk

Decision making

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Varietal selection

Crop management

Site selection

Chemical control

IPM strategies for free-living nematodes

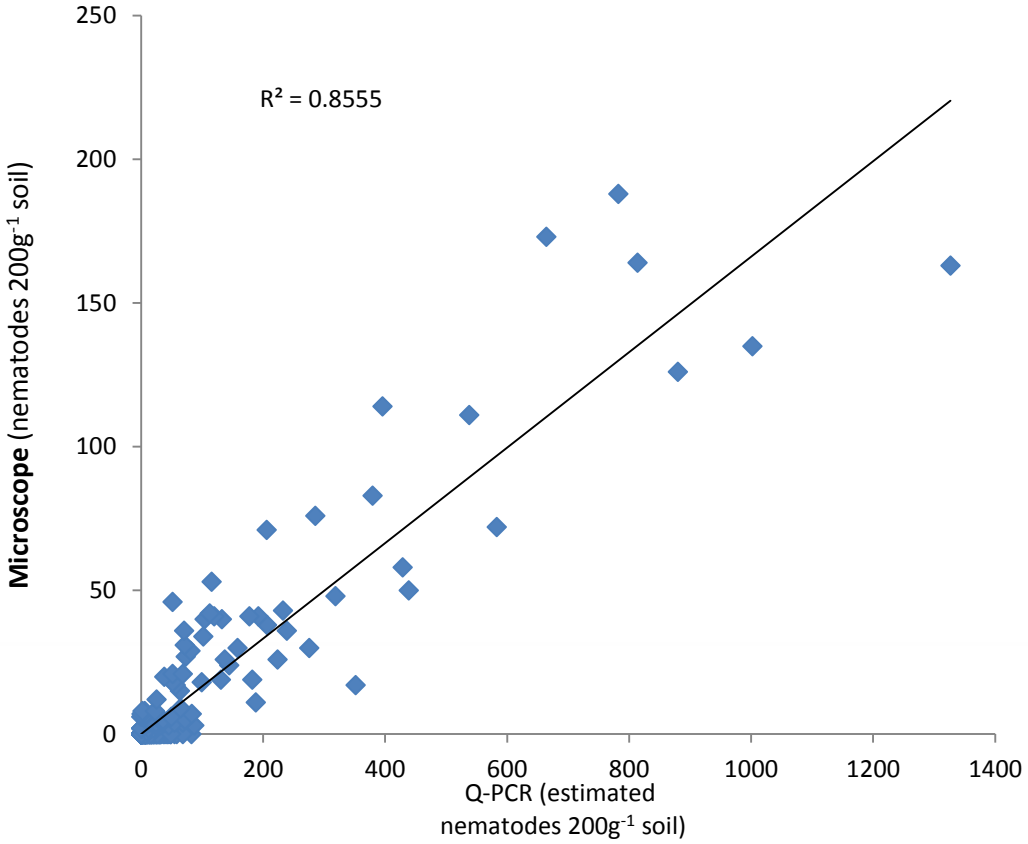
- *Trichodorus; Paratrichodorus; Nanidorus; Longidorus*
- Feed on roots - stunted crops, reduced yield and quality.
- Vector or non-vector species
- Mixed populations
- 13 virus-vector species (8 in UK)
- Identification of specific groups can be difficult
- Decreasing skill base of taxonomic expertise

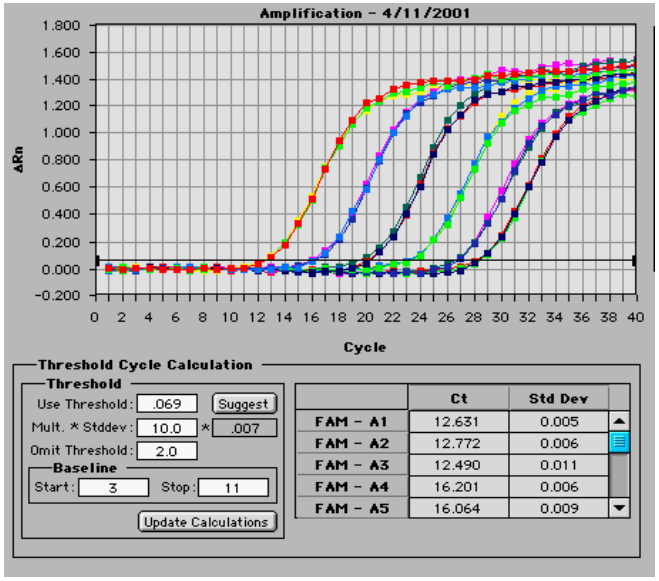
FLN and Spraing

Free-living nematodes (FLN) transmit Tobacco Rattle Virus (TRV) leading to spraing symptoms in potato.

Through a consortium of academic and industrial partners, strategies for quantifying and controlling free-living nematode populations and consequent damage by Tobacco Rattle Virus to Improve Potato Yield and Quality have been developed.

Diagnostic testing of FLNs





New technologies – Optical imaging

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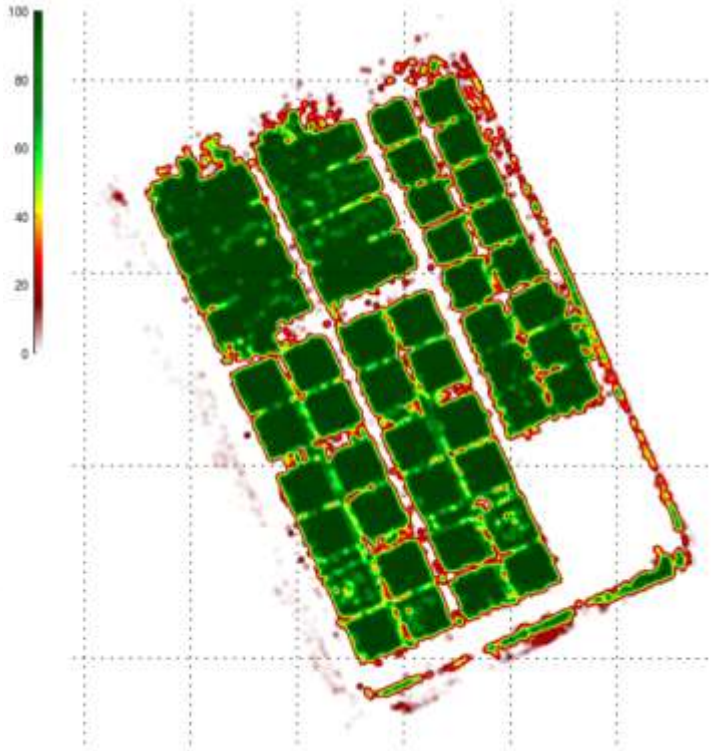
Aims:

- Direct growers to problem areas
- Trigger decision management systems to minimise:
  - economic impact of diseases
  - environmental impact of disease control



New Technologies - Poptical

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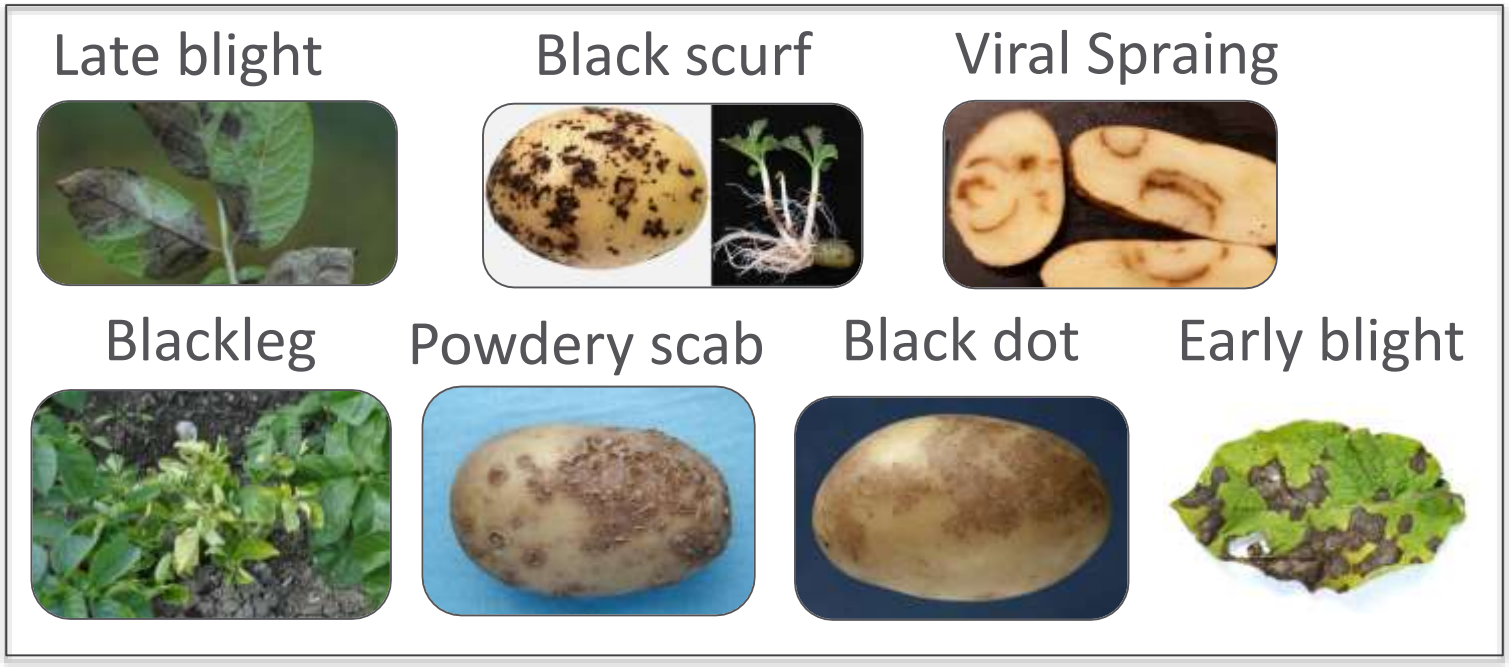
"In-field optical detection of potato diseases"

- Assess robustness of aerial imaging
- Provide early detection data for disease management decisions
- Has potential to 'map' problems to inform crop rotations



New Technologies - Poptical

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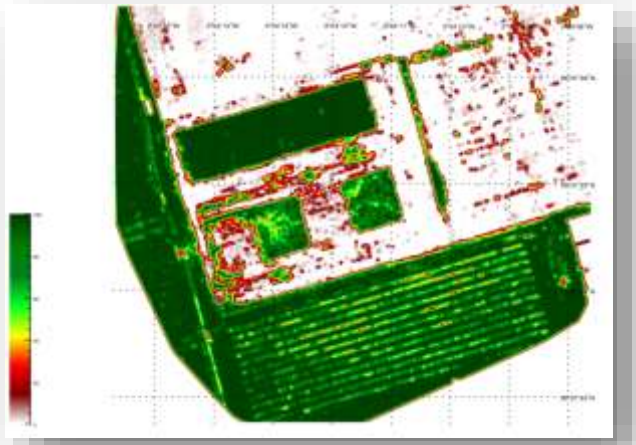
- Challenges
  - Differentiate between overlapping disease symptoms
  - Detection on ‘symptomless’ plants
  - Accurate disease diagnosis



- Areas of exploration
  - Optimal flight timings
  - Growth changes over time
  - Most sensitive wavelengths for specific pest groups
  - Data analysis techniques

The potato IPM toolbox

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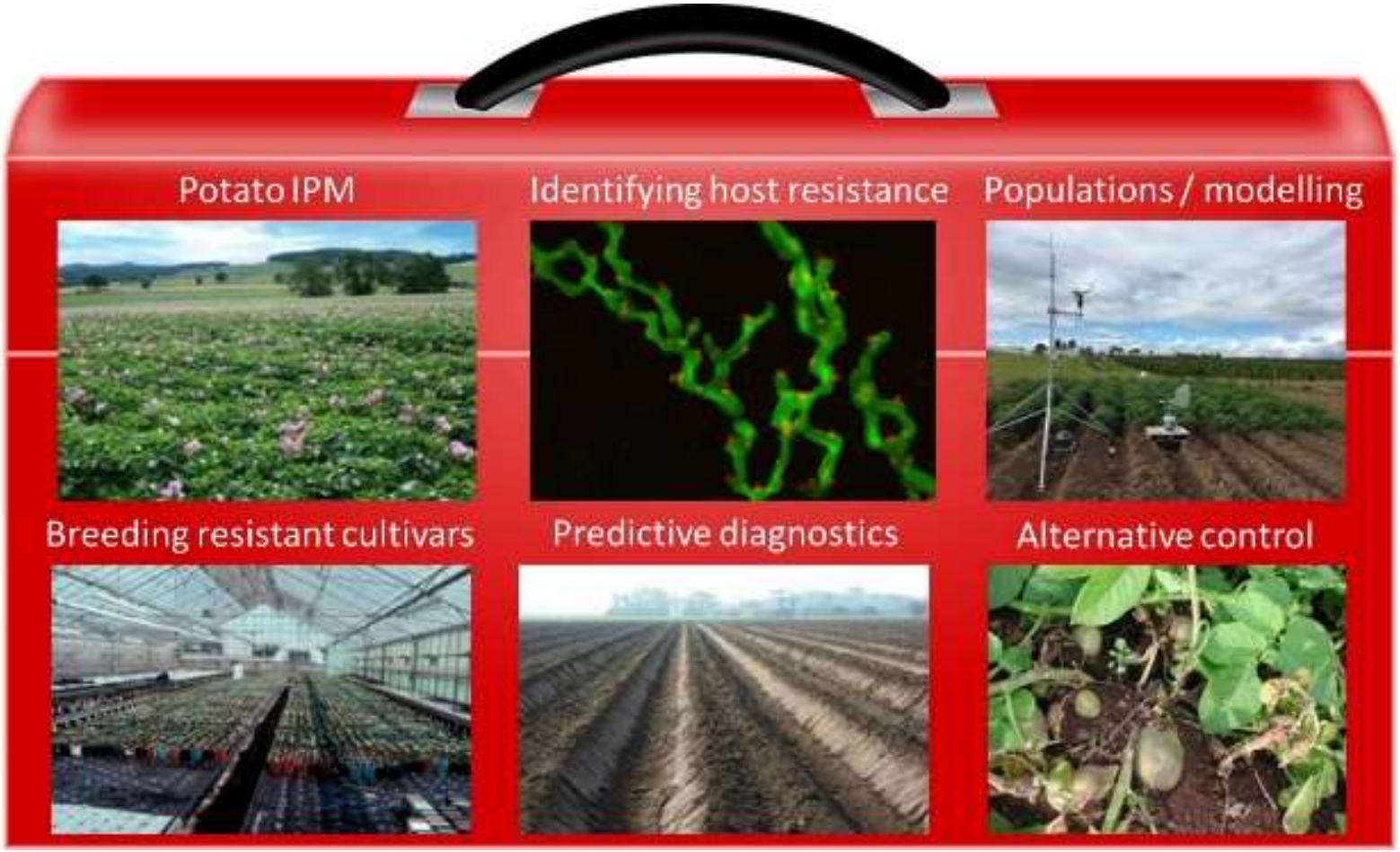

Farm scale

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Centre for sustainable cropping platform

Acknowledgements – Innovate projects

Hummingbird Technologies

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manor fresh limited™

Innovate UK
Technology Strategy Board

TOZER SEEDS

Harper Adams University

cygnet PB

PEPSICO

DUPONT
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