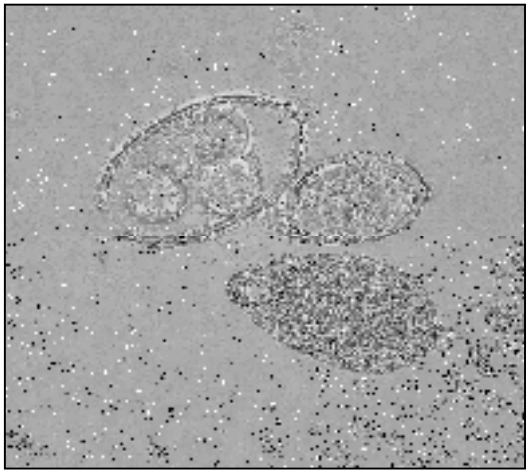
Potato late blight research: Impacting on science, the economy and the environment

Potato Crops

- One of the most ‘important’ food crops both globally and in Scotland
- 2016:
  - 27 500 hectares plants
  - Across 2 600 farms
  - 12 700 hectares of seed
  - 14 800 hectares of ware
  - A value of £209 million

Potato Late Blight

- Late blight is caused by an oomycete pathogen called *Phytophthora infestans*
- 99% of fungicides used on potatoes in Scotland are for the treatment of potato late blight



Integrated Pest Management

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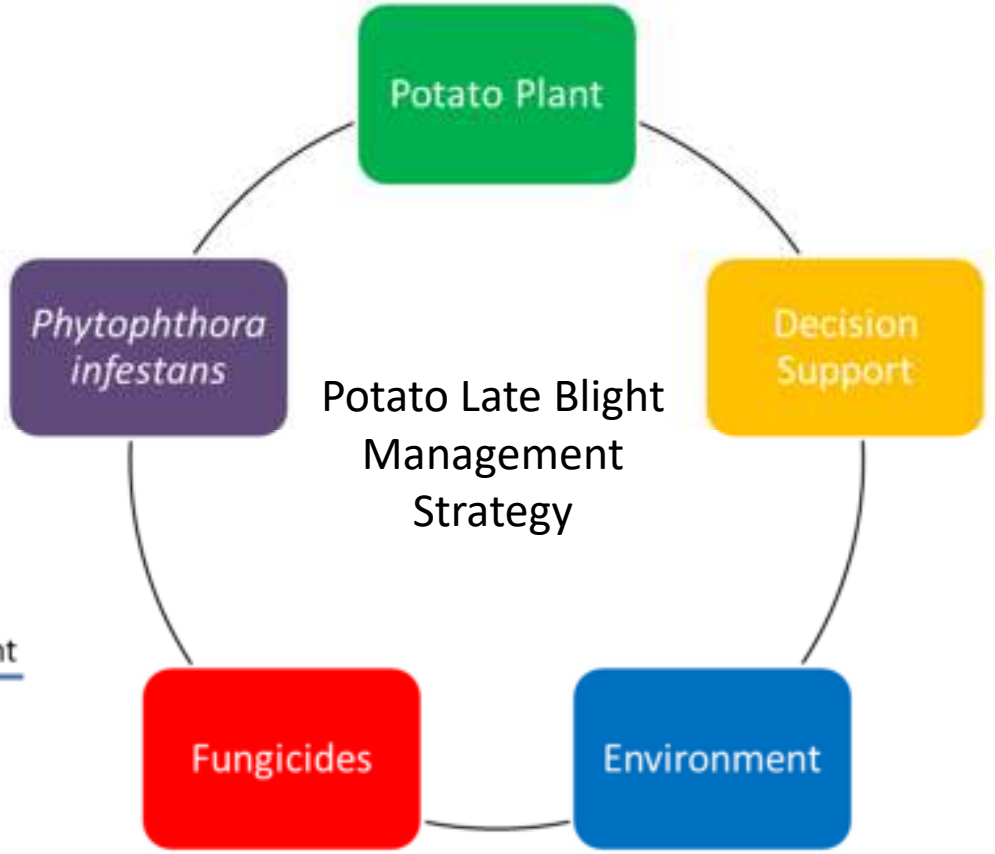
- WP 2.1 late blight research is undertaken under IPM to directly inform practice
- Impacts seen with:

i Population monitoring: genotypic and phenotypic analysis

ii Decision support tools for identifying risk

iii Fungicide guidelines and development

iv The future of blight management



P. infestans populations

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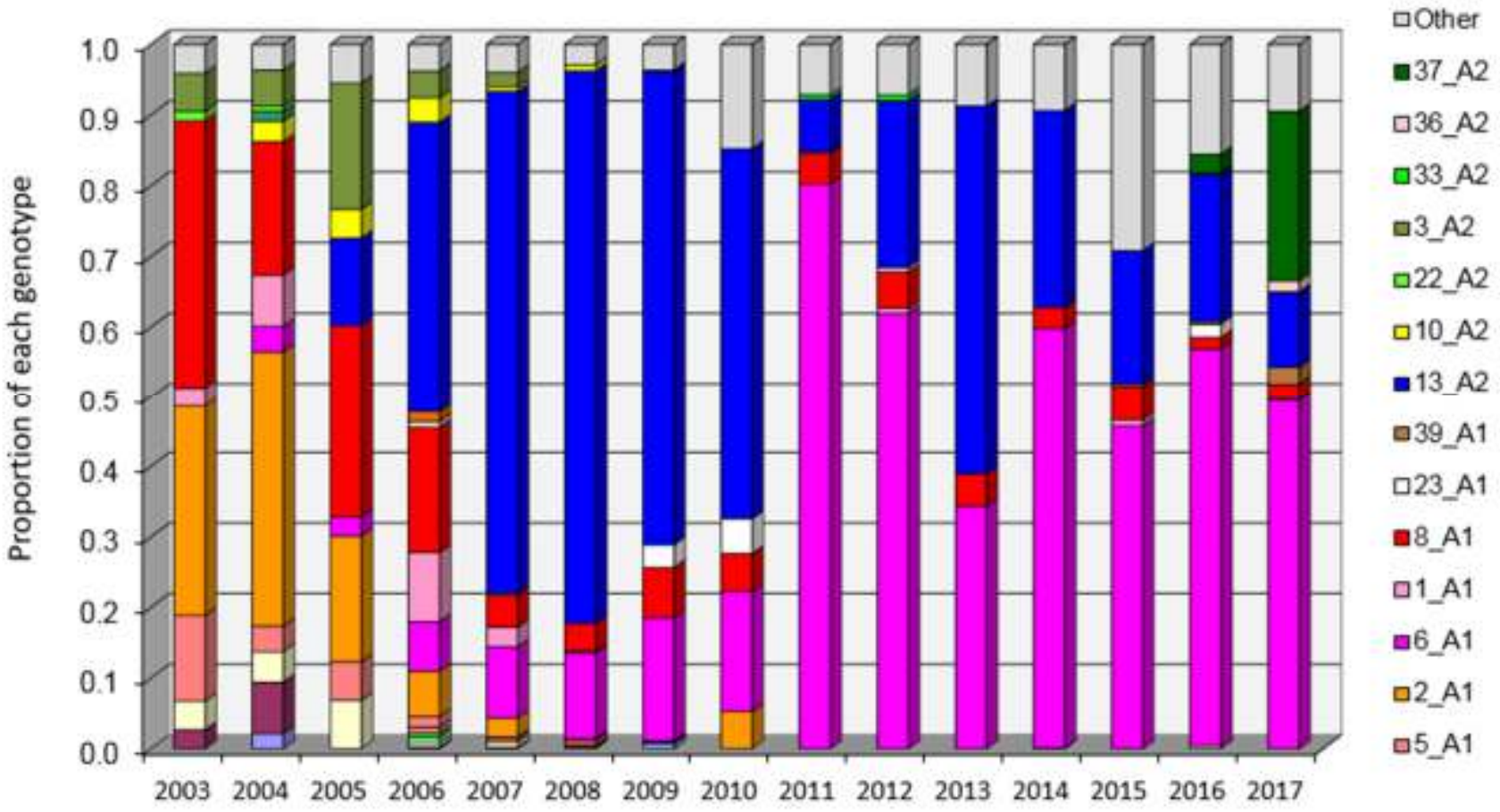

Potato Late Blight

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Allows for:

1. Quantification of the infection parameters
2. Investigation of resistance in potato varieties
3. Effectiveness of fungicide treatments
4. Networking with European and international bodies

FIGHT AGAINST BLIGHT

Blightwatch

syngenta

AHDB POTATOES

EuroBlight
A potato late blight network for Europe

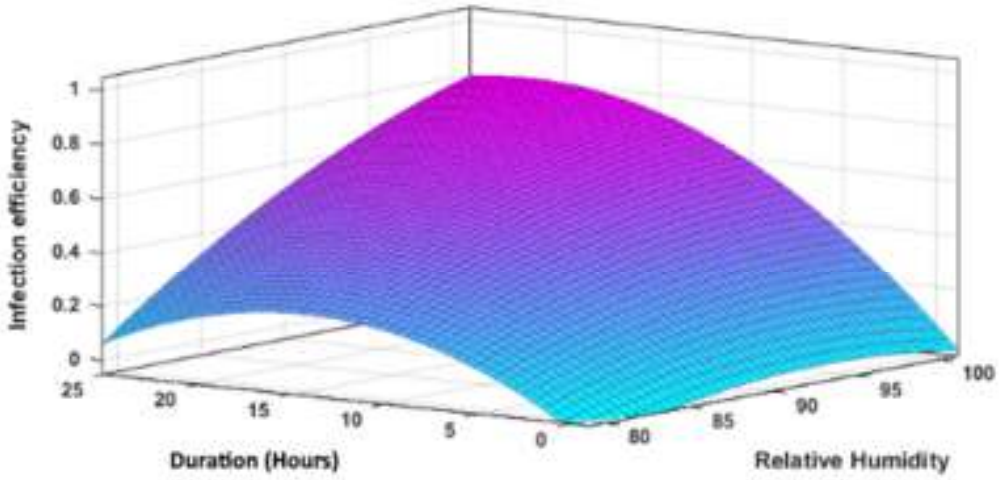
Innovate UK

soilessentials
precision farming solutions

FRAG - UK

Potato Late Blight

- Temperature, relative humidity and duration of exposure are key factors for identifying risk of infection from sporangia
- Smith Period – risk criteria defined in the 1950s
- Modelling work from 2011 – 2016 to investigate risk criteria
  - Contemporary genotypes
  - Large historic data set of outbreaks
  - Modern analysis techniques

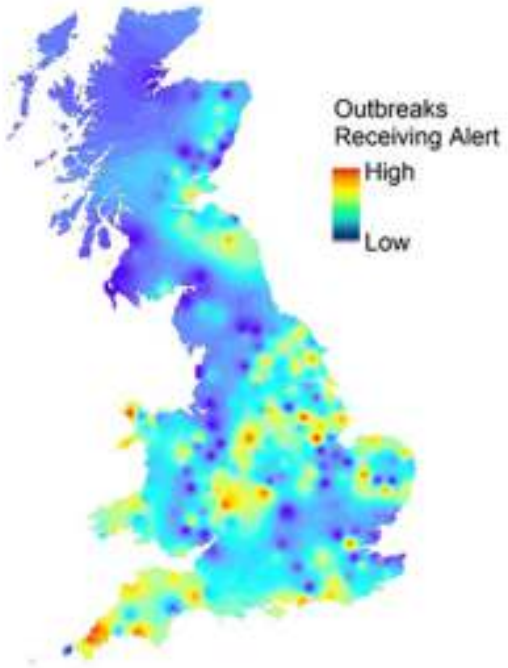


Hutton Criteria

- Hutton Criteria were launched in 2017
- Performed significantly better as indicators of risk prior to the reported outbreaks
- Performed more uniformly across Great Britain

Smith Period:

Hutton Criteria:



Hutton Criteria

- Launched for the 2017 growing season
- Blightwatch is AHDB and levy payer funded
- ~17 000 subscribers in Great Britain in 2017
- >100 000 views in 2017

Hutton Criteria

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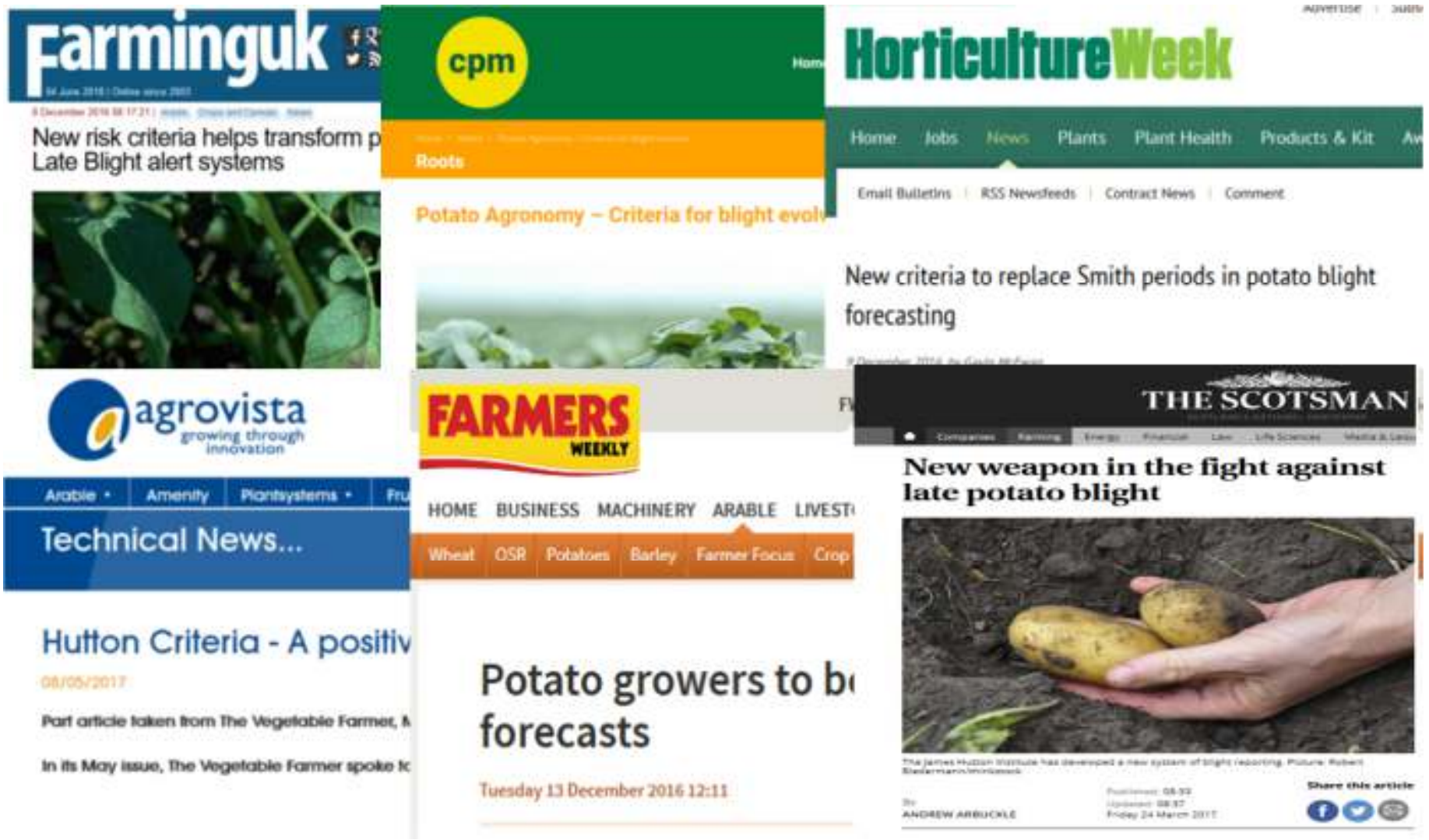

Precision Agriculture

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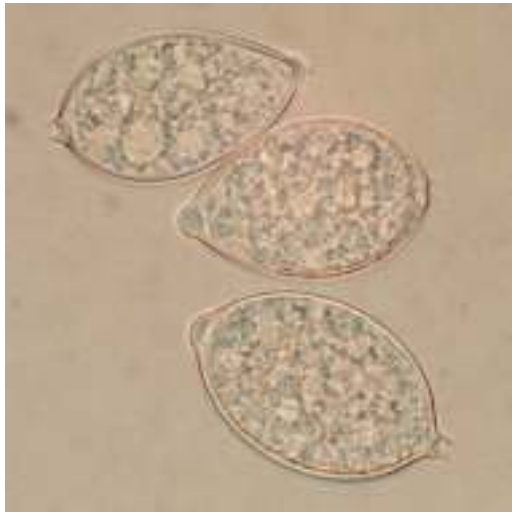
- Weather based forecasting assumes the presence of inoculum
- In-field spore detection can inform management decisions

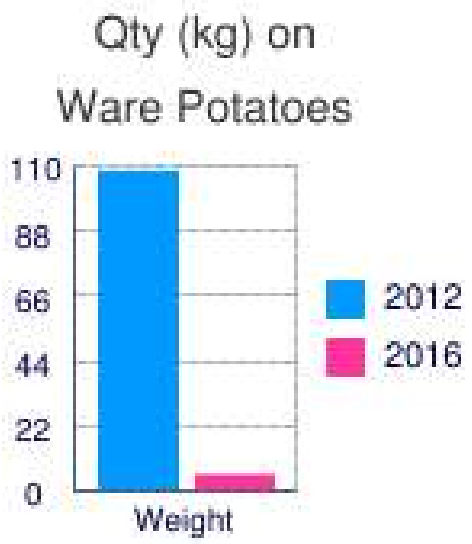


Innovate UK

Changes to Fungicide Use

- Phenotypic and genotypic analysis has allowed for identification of reduced sensitivity to key blight fungicides
- Allows for rapid changes to blight management programs
- Incorporated into FRAG guidelines for 2018

Ex. 1: Metalaxyl-M use in Scotland



Ex. 2: Fluazinam

Fungicide use Reception

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New Fungicide Development

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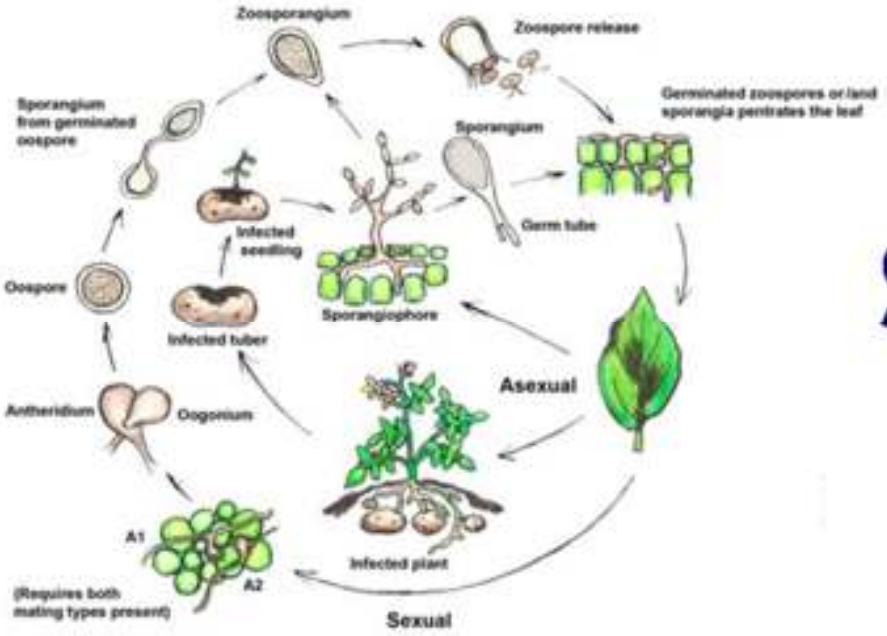
- Targeted based screening for new agrochemicals
- Based on genomics and pathogen biology
- Working with large agrochemical companies, one of which is Syngenta

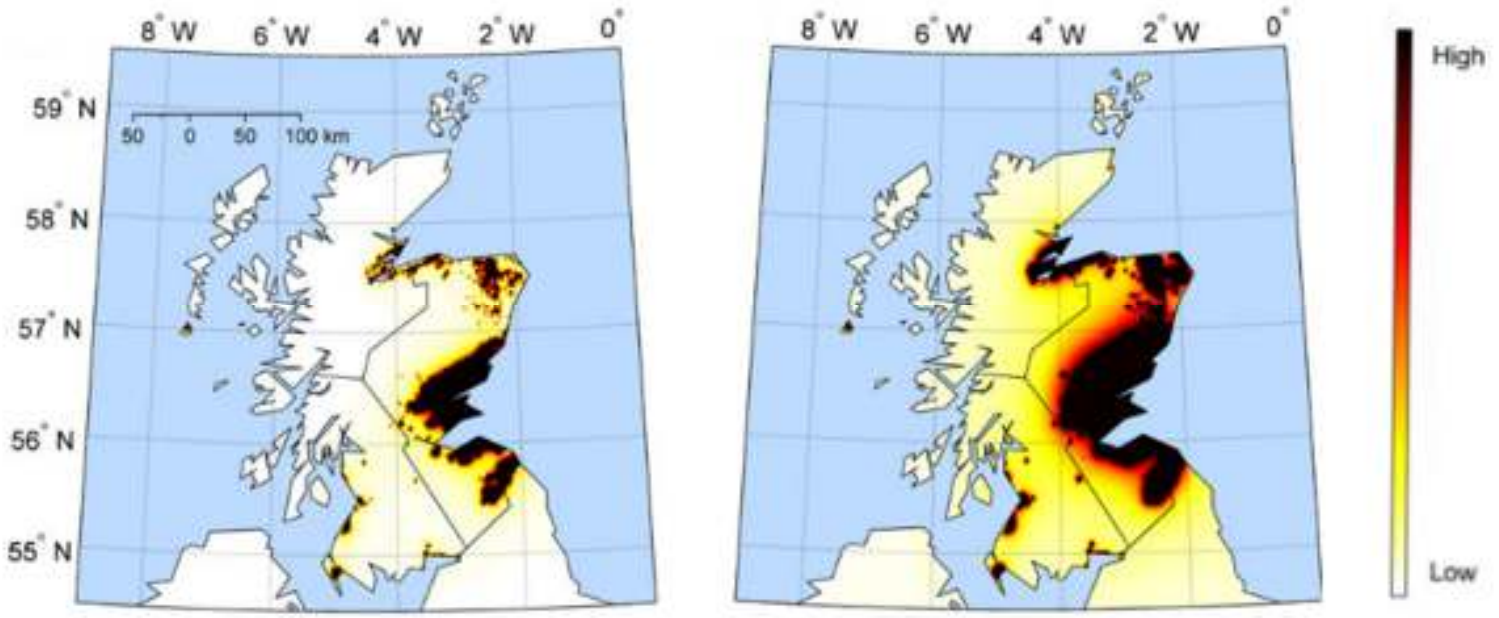


syngenta

Climate Change

- A base to future climate change modelling and understanding how risk will change in the future
- Work has already occurred to determine the spatial distribution of the pathogen and viability of the pathogen

Spatial distribution of Phytophthora infestans sporangia in 2080 using two different CO2 scenarios:



Baseline CO2

High CO2

Communication

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- Dissemination of findings and communication with growers and other researchers is key
- Agronomists conferences, potatoes in practice, Euroblight

Potatoes in Practice

EuroBlight
A potato late blight network for Europe

Collaborative projects working with growers and industry to provide tools and advice for growers for today and tomorrow.