# *P. infestans* Population Changes: implications

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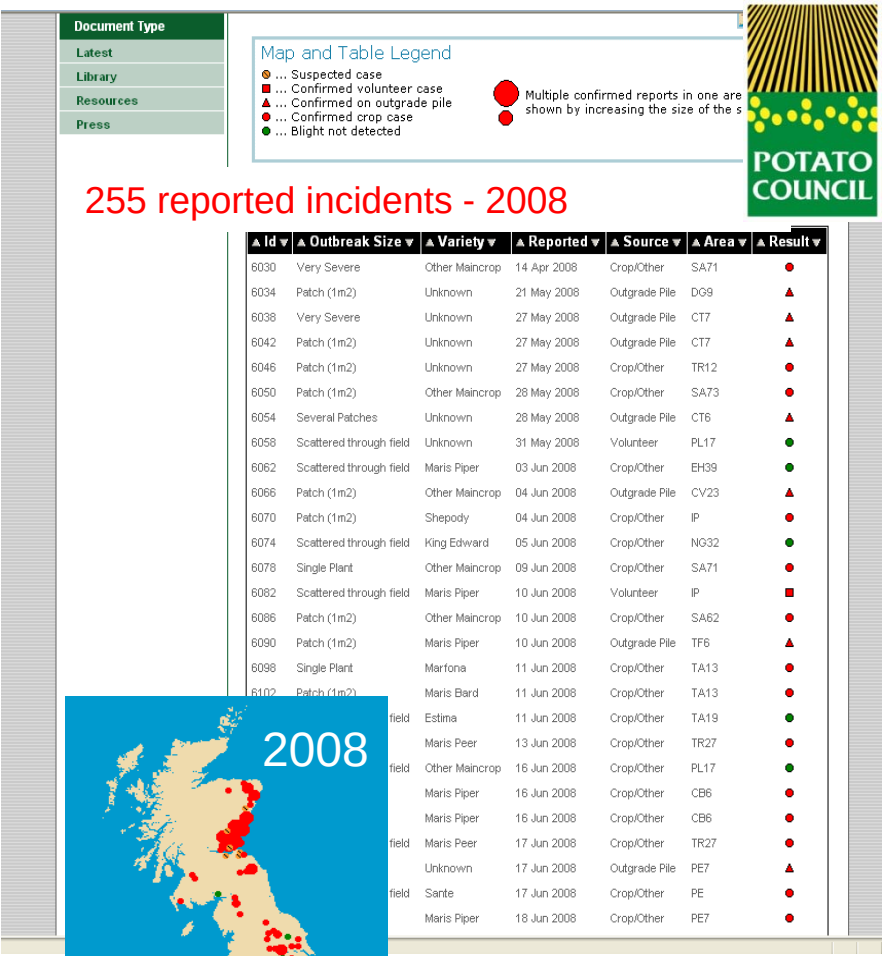
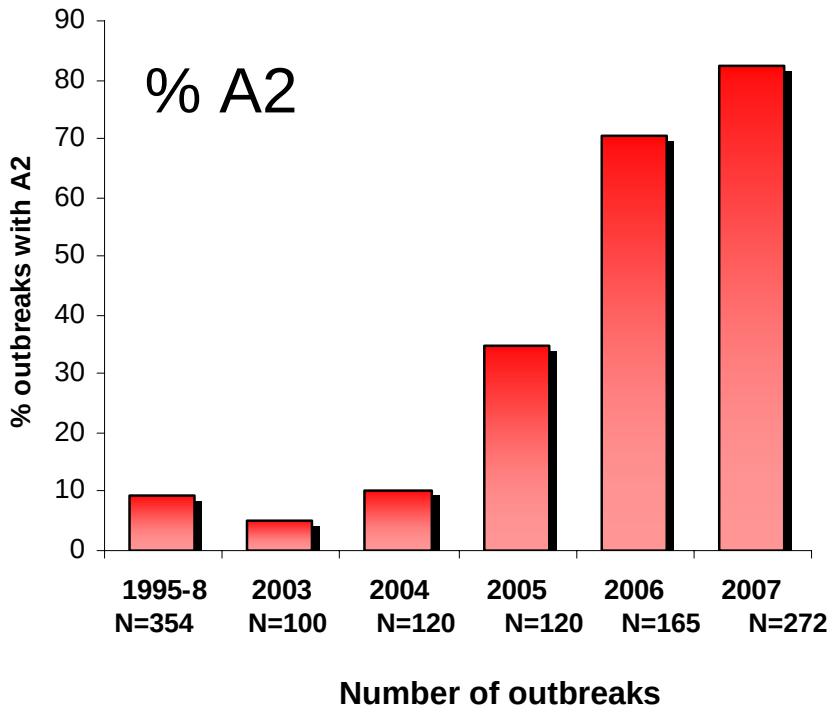
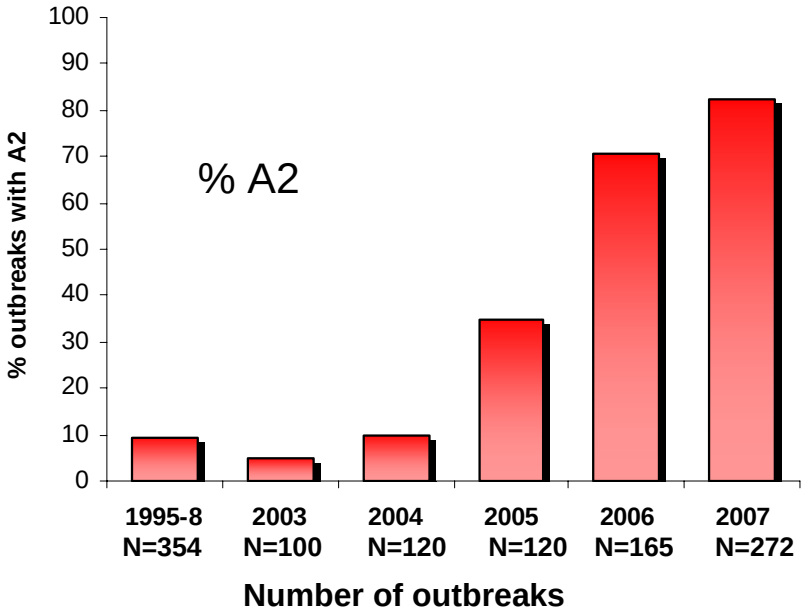


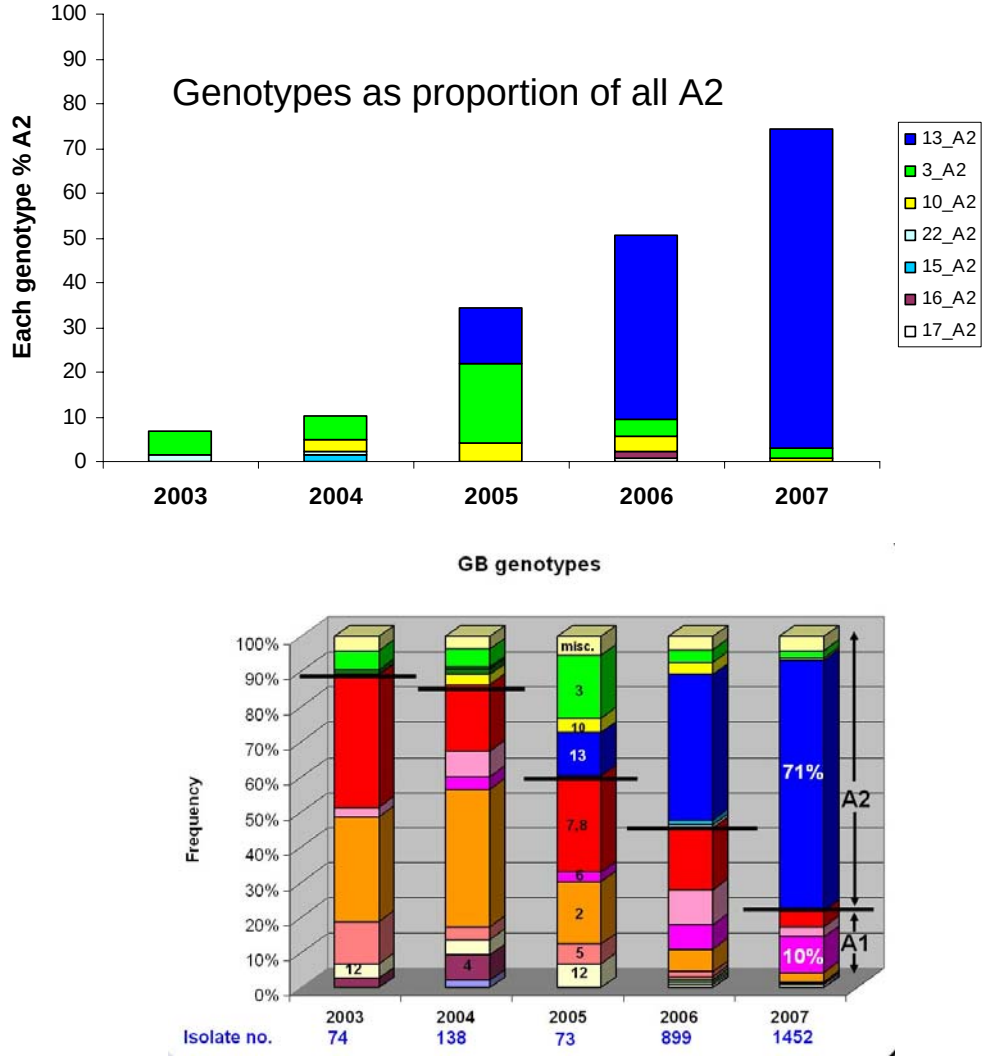

Isolates characterised for:

mating type

genotype






- Major changes in population
- Increasing proportion of A2
- This increase mainly attributed to an increase in a particular clonal lineage

This genotype is known as 13_A2 ('blue A2')

Why is 13_A2 dominating and does this matter in terms of controlling late blight?

Not because it is A2 but because it exhibits other characteristics:

**Estimation of 1-9 scale values in Eucablight**

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## FAB work by scouts keeps check on blight

Research carried out as part of the British Potato Council Fight Against Blight (FAB) campaign has helped develop industry understanding of blight populations in Britain. Scientists and other industry experts, who gathered at the BPC's UK Blight Forum in Peterborough this week, have heard how blight scouts are providing valuable information to help growers combat Britain's number one

# Blight bruises potato growers' confidence

THE ANNUAL Potatoes In Practice day held at Gourdie on the western outskirts of Dundee is now a major event, **writes Ewan Pate, farming editor.**

For some years it has been hailed as the largest outdoor potato exhibition in the UK, but this year it looked the part with larger marquees, more exhibitors and more visitors from across the country and overseas.

Much of the success must come from cross-industry support. The fection and making control of the disease even more difficult.

"We are in the middle of a three-year project but it seems we have a blight which is harder to control and more aggressive," he said.

SAC head of crop services Stuart Wale said, "There are problems with these new strains which seem to originate from the continent. They are more variable and more difficult to control. It looks like it means staying to fitting

The challenges of accelerating changes in climate and diseases is one which Professor Peter Gregory, chief executive of SCRI, is only too well aware.

"Blight pathogens are an example. Much of it fits into a climate change scenario which we have to understand in terms of increasing rainfall and higher temperatures, said Professor Gregory.

"We have to be able to look ahead and much of the work funded by SEERAD helps us to develop genetic markers so that we can quickly identify change and then tweak research in the right direction.

The information we amass is important to potato breeders, for example, who are working hard to breed in disease resistance."

Some of the new varieties will be targeted for export markets. A group of Egyptian growers and potato specialists were at Gourdie yesterday on a visit organised by fertiliser company Yara and potato specialists Greenvale.

Tarek Osama, of Yara Egypt, said, "We are big consumers of potatoes with much of the domestic supplies coming from the old production areas in the delta.

"But the real expansion is in the new growing areas on sandy soils near Cairo where over the last 10 years the area has increased from nothing to 50,000 hectares.

"These are grown for seven or eight processors including Fritolay and Farmfrites. One of my colleagues here is responsible for growing 400 hectares and the whole area is irrigated using centre pivots, micro sprinklers or drip irrigation."

Hopefully the interest they were showing in the variety plots will lead to new orders for seed potatoes.

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## Industry benefits from new blight research

Research carried out as part of the British Potato Council Fight Against Blight (FAB) campaign has helped develop industry understanding of blight populations in Britain. Although the prevalence of the newer A2 blight genotypes(1) has risen, the latest findings suggest the number of different genotypes is stable, safeguarding current strategies for tackling the disease.

"In 2006 we studied samples sent in by blight scouts and from other sites to develop our understanding of how blight populations are changing," reported BPC R&D director Mike Storey. "We found the A2 blight strain at 66 per cent of the sites we tested. Mixed

2007

BRITISH POTATO 2007
BRITISH POTATO COUNCIL
NOVEMBER 28 & 29
YORKSHIRE EVENT CENTRE, HARROGATE
SPONSORED BY BRANSTON

# Blight fight proves struggle

## NEW STRAINS ARE HARDER TO CONTROL

POTATO late blight is undoubtedly present in many crops and the effect is as yet unknown, those attending the annual Potatoes in Practice day at Gourdie, Dundee, were told yesterday.

East Lothian farmers

He has been involved in a team looking at the increasing incidence of the A2 type which can reproduce with the much more prevalent A1 type to produce spores which can be soil borne and survive for several years creating a reservoir of infection and making control of the disease even more difficult.

"We are in the middle of a three-year project but it seems we have a blight which is harder to control and more aggressive," he said.

### ROTATIONS

SAC head of crop services Stuart Wale said: "There are problems with

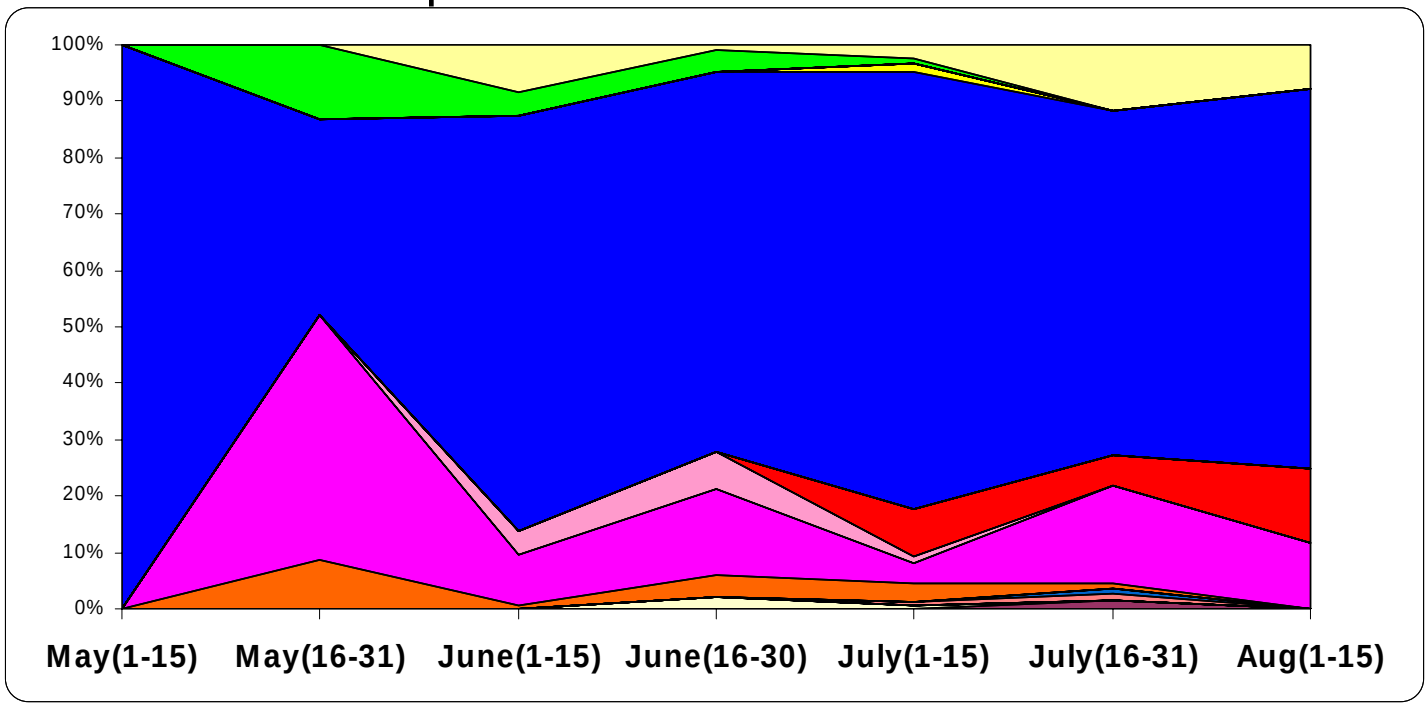
Nelson, of potato packers Branston, pointed out that 60% of the chemicals approved for use on potatoes in 1993 are no longer on the approved lists.

There are also pressures from retailers and other agencies such as Sepa to grow potatoes with less risk to the environment, including safeguarding water quality and preventing soil erosion. There are also questions raised about the carbon footprint of the crop.

The challenges of accelerating changes in climate and diseases is one which Professor Peter Gregory, chief executive of SCRI, is only too well aware.

"Blight pathogens are an example. Much of it fits

## 2007 all GB samples ~ 1400

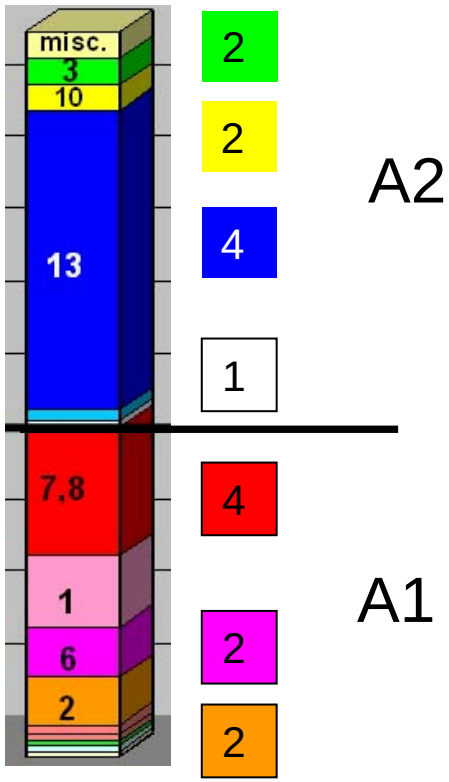



**13_A2 present/dominating throughout the growing season**

- **Survives overwinter**
- **Infects early**

# Characteristics of 13_A2 and implications - Aggressiveness

17 GB isolates




- *Aggressiveness* – amount of damage caused to leaves, stems and tubers
- *Fitness* – disease spread within (sporangia and zoospores) and between (tubers or oospores) seasons
- Compared the aggressiveness of a range of GB and foreign *P. infestans* genotypes against foliage and tubers of a range of potato varieties under different conditions.
- 17 GB 2006 isolates
- 9 other isolates: 6 foreign (2 NL (04&06), 2 PL(05), 2 SE(03) 2 SCRI controls (1995 &1997),1 Irish isolate LD151
- 5 cultivars

# Characteristics of 13_A2 and implications - Aggressiveness

- Field foliar

  5 isolates released into field trial and tracked over epidemic

- Foliar

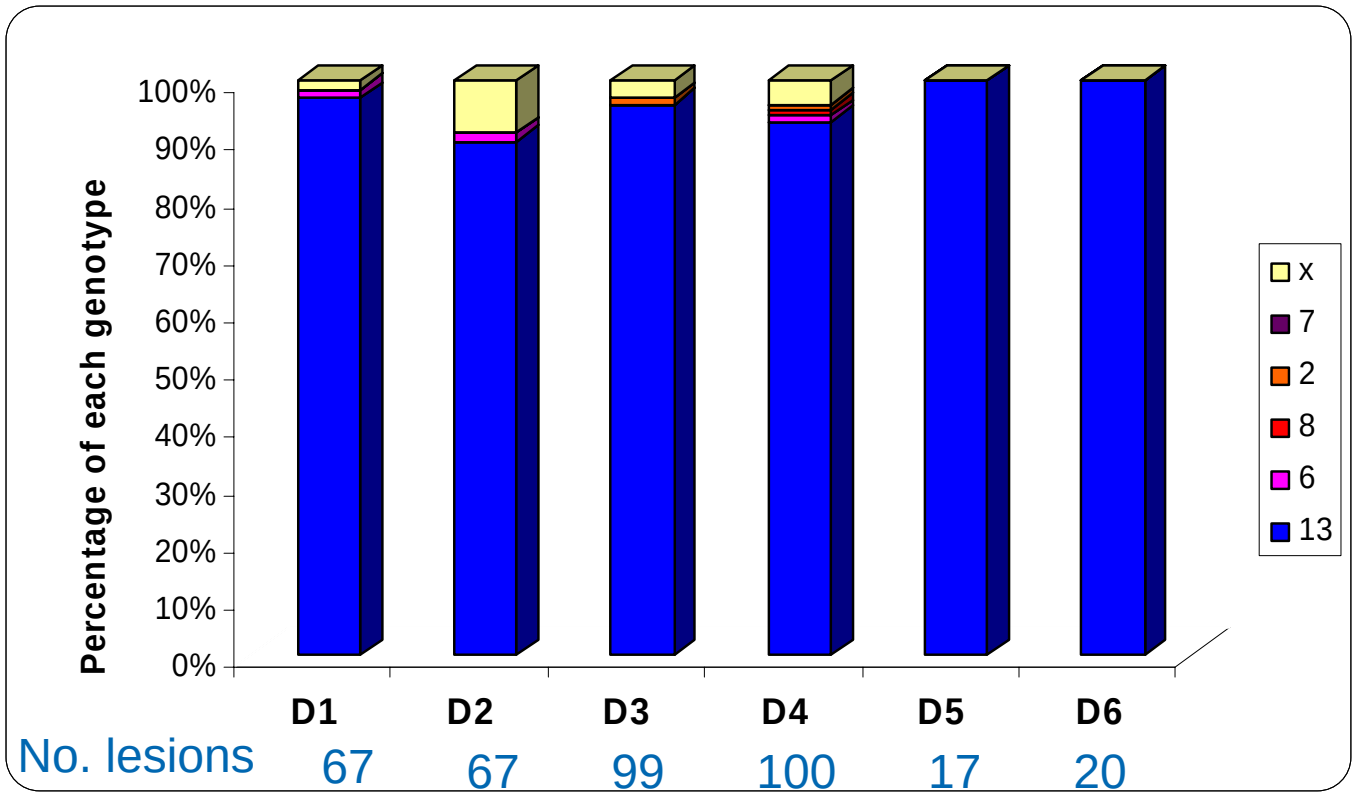
  26 isolates: detached leaves of glasshouse grown plants at two different temperatures in growth chambers

- Tuber

  4 isolates: field-grown whole tuber test

| Resistance rating | Foliar | Tuber |
|---|---|---|
| King Edward | 3 | 4 |
| Maris Piper | 4 | 5 |
| Estima | 4 | 5 |
| Cara | 7 | 7 |
| Lady Balfour | 8 | 7 |

# Characteristics of 13_A2 and implications - Aggressiveness (Field Foliar)



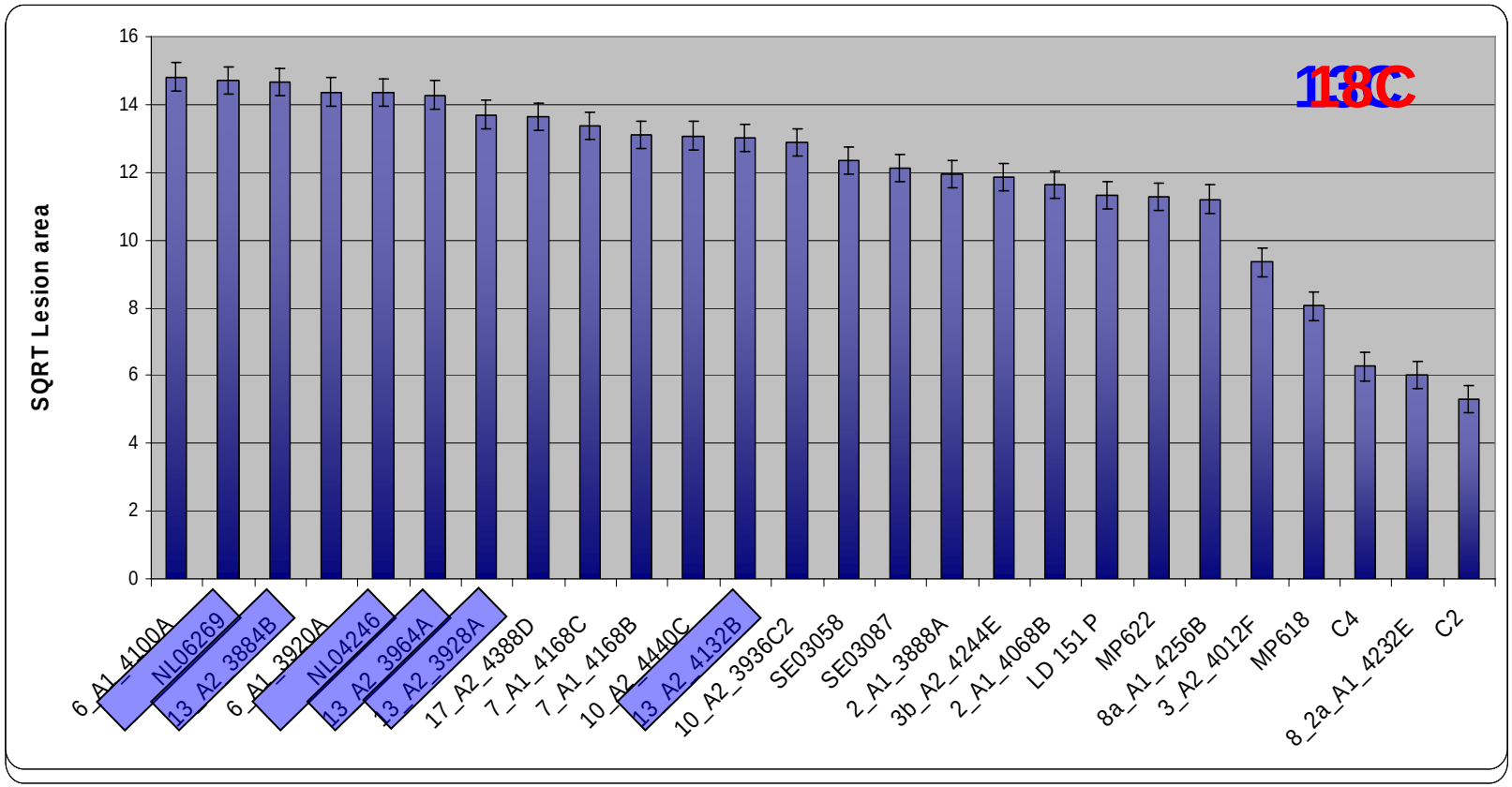

- All isolates were pathogenic in lab test at D0
- Domination of genotype 13_A2
- Four other genotypes (1 alien) rare

# Characteristics of 13_A2 and implications - Aggressiveness (Foliar)

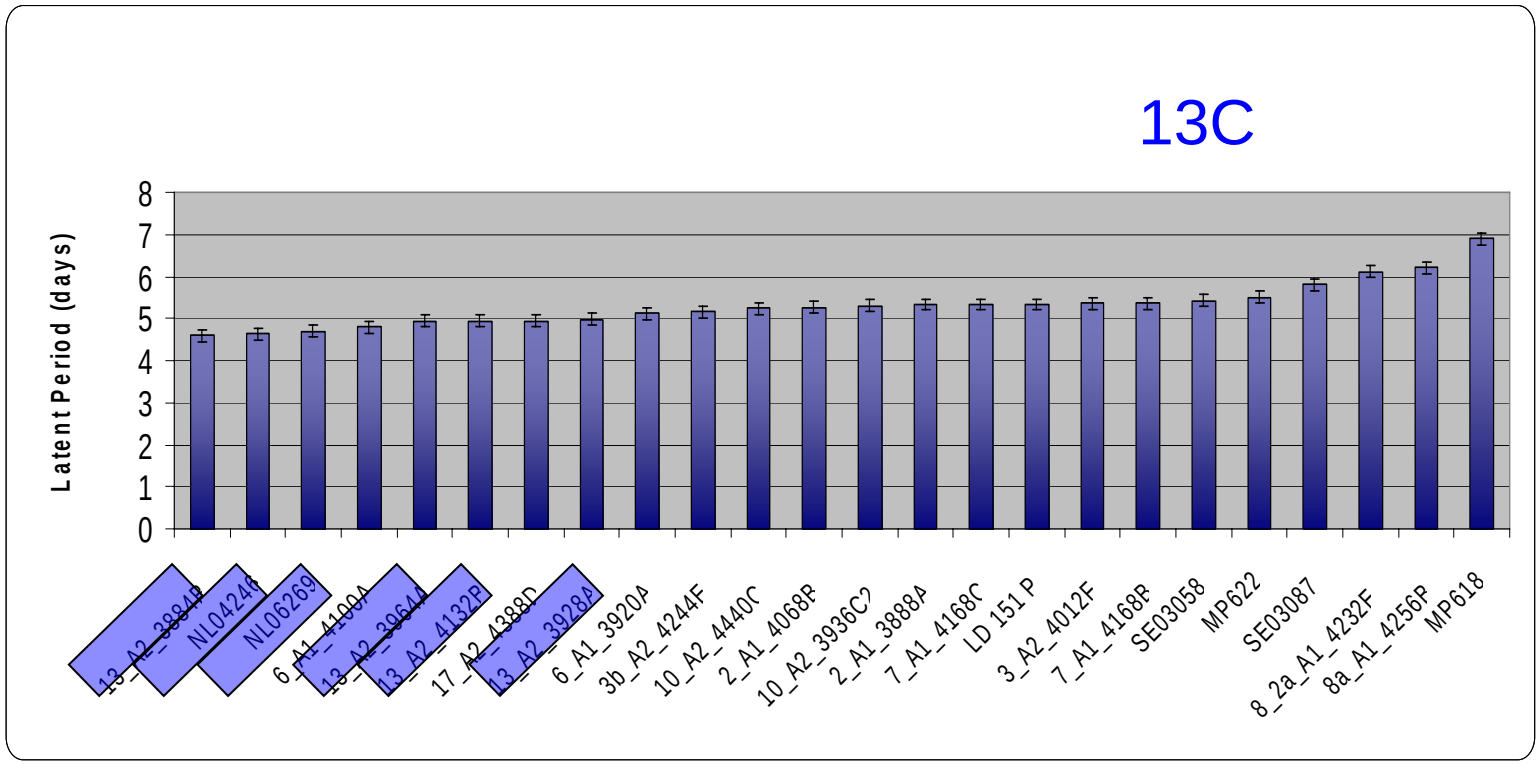
- **26 isolates**
- **5 varieties**
- **2 temperatures 13ºC & 18ºC**
- **6 replicates in RCB design**
  **1560 detached leaves in 60 boxes**
- **Inoculation**
  **Isolates maintained on Craig's Royal**
  **420 sporangia per droplet**
- **Factors recorded**
  **IP – incubation period –** time to 1st symptoms
  **LP – latent period –** time to sporulation
  Lesion size (2 measurements) at 6 d.a.i**.**
  **(Strongly correlated with other traits such as sporulation)**

# Characteristics of 13_A2 and implications - Aggressiveness (Foliar)

## Lesion area (mean of all varieties)

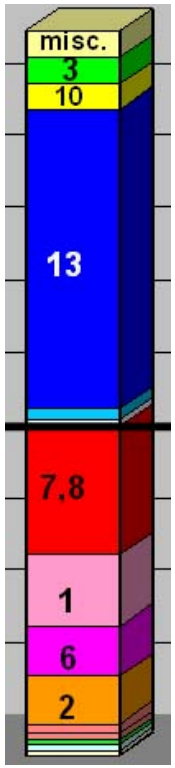


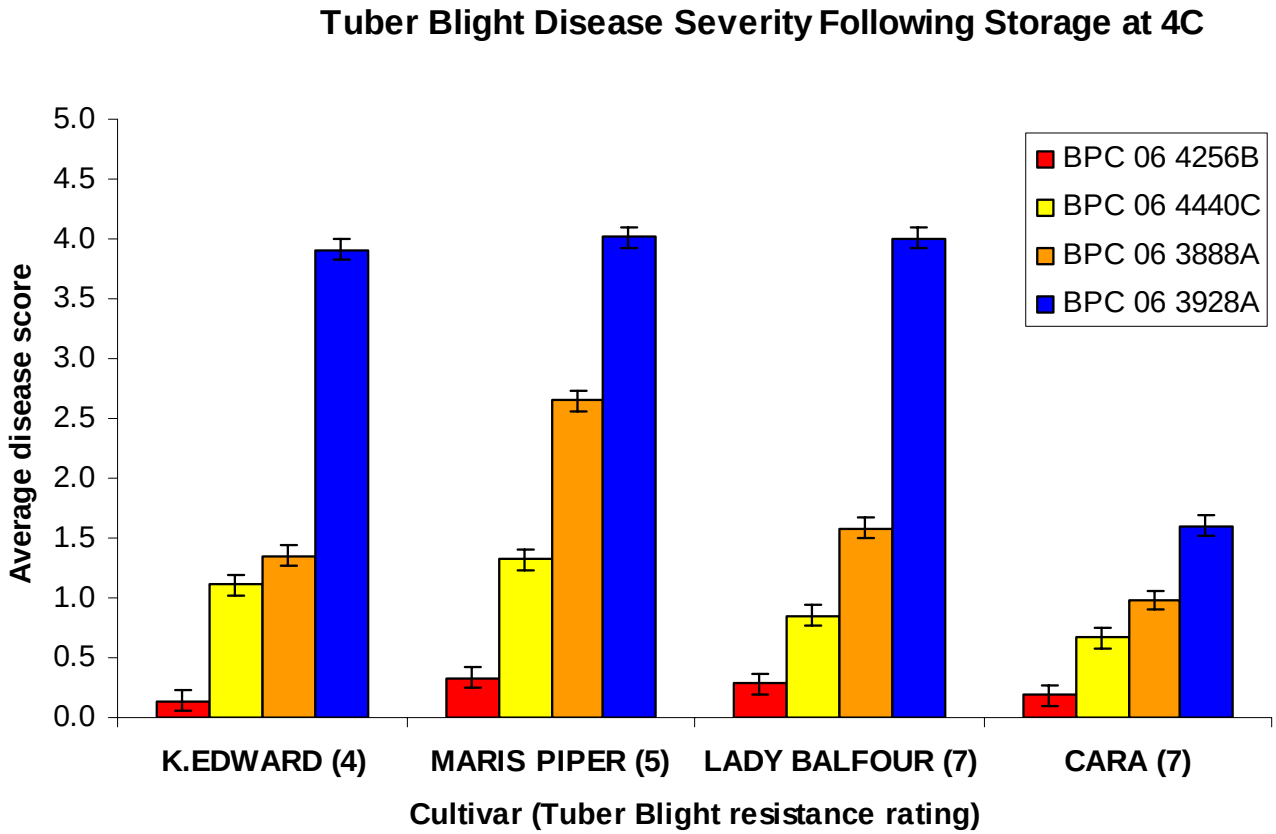
# Characteristics of 13_A2 and implications - Latent period




- On average, genotype 13_A2 isolates sporulate sooner than other genotypes at 13ºC

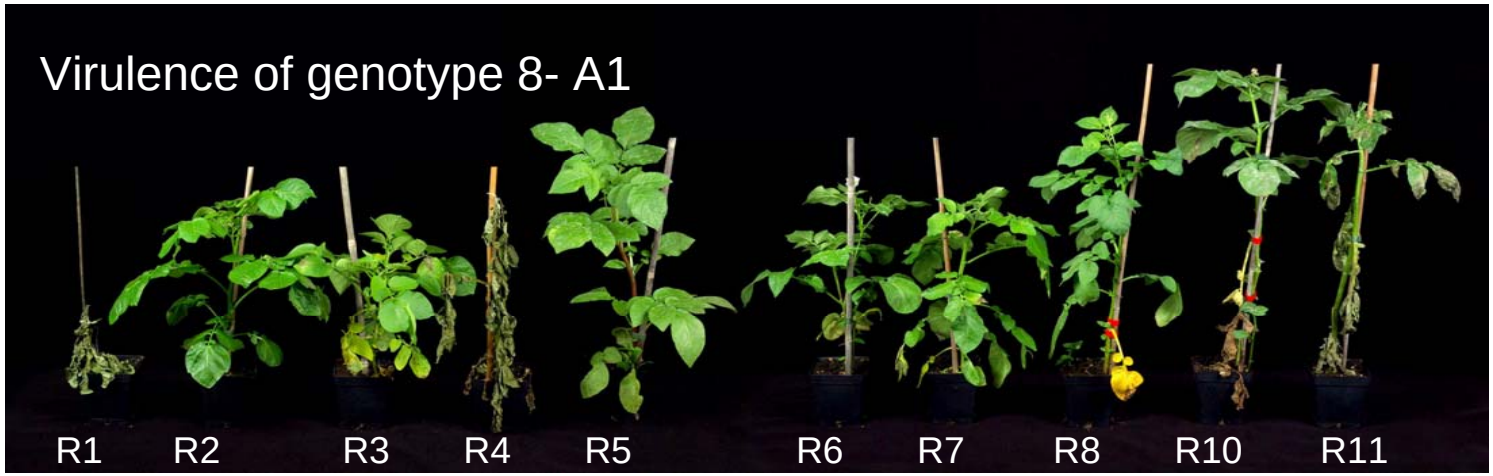
# Characteristics of 13_A2 and implications - Aggressiveness (Tuber)




- genotype 13_A2 resulted in significantly more disease that isolates of other common genotypes after 12 weeks at 4C

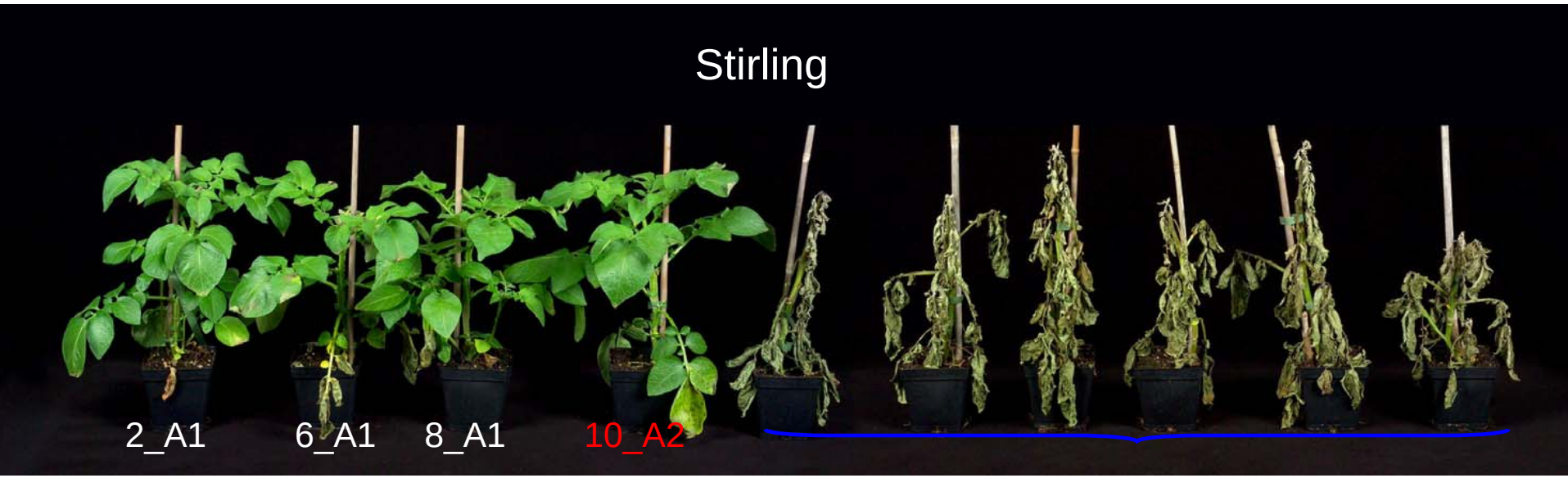
# Characteristics of 13_A2 and implications - Virulence





Race: 1,2,3,4,5,6,7,10,11

# Characteristics of 13_A2 and implications - Host Resistance



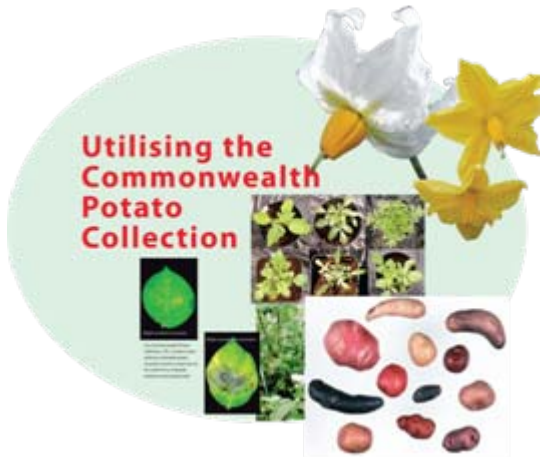

2006/7 Anecdotal reports that historic resistance ratings are no longer valid for some cultivars

Stirling in SCRI trial 2007

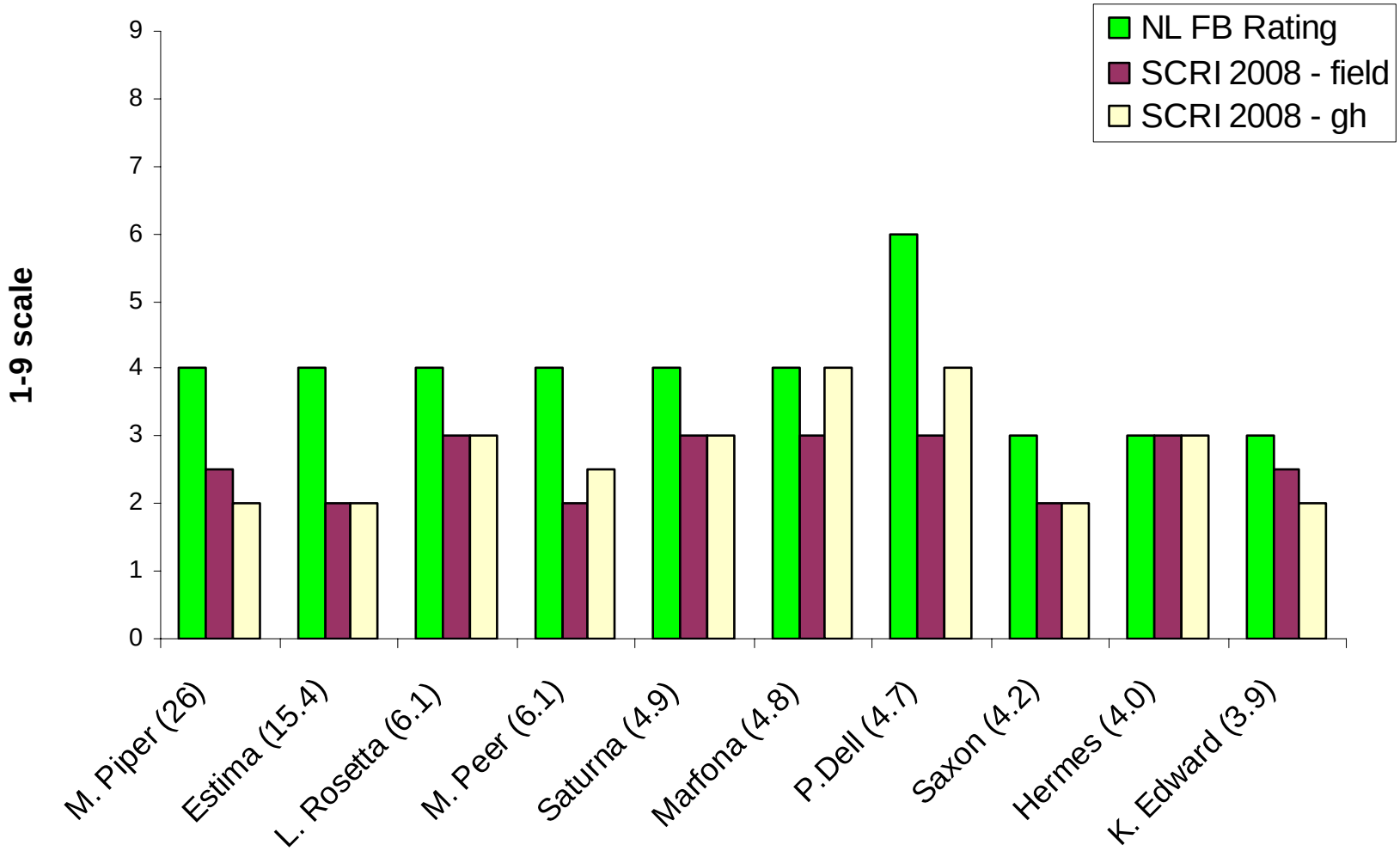
# Characteristics of 13_A2 and implications - Host Resistance

2008 SCRI & SASA – Foliage Blight tests

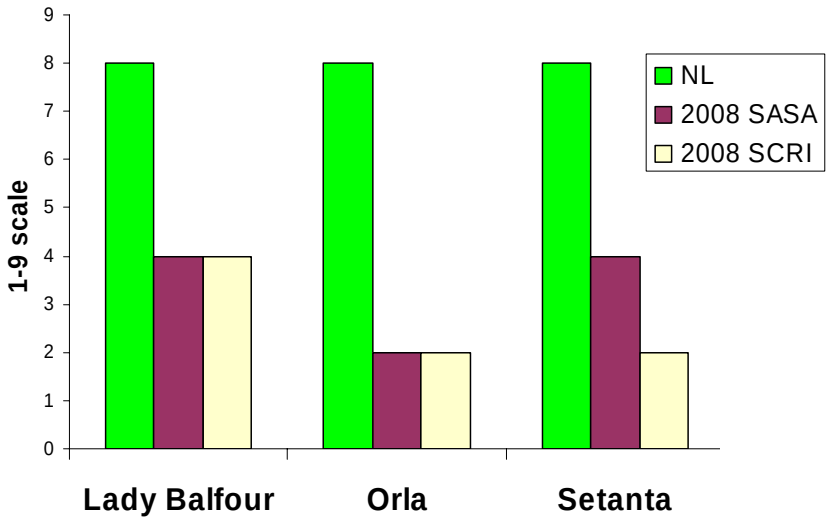
- re-screened cultivars, parental breeding material and wild species from CPC with isolate of 13_A2
- 10 most popular commercial cultivars according to Potato Council figures on planted area 2007
- & other cultivars, as appropriate, for which there is circumstantial evidence for decreased host resistance e.g. Stirling, Setanta and Orla.

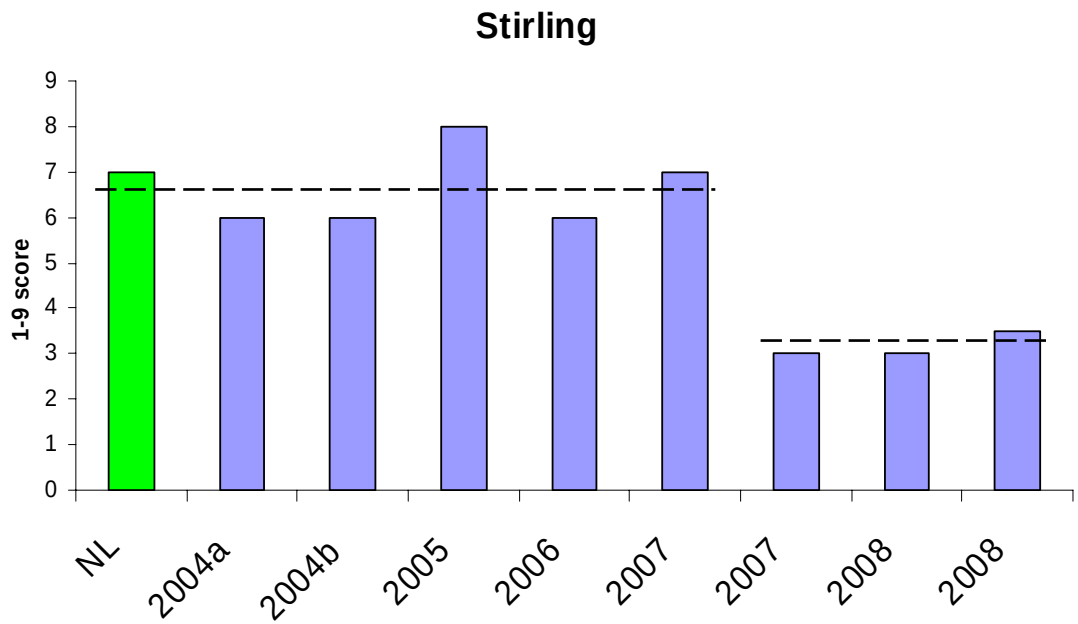


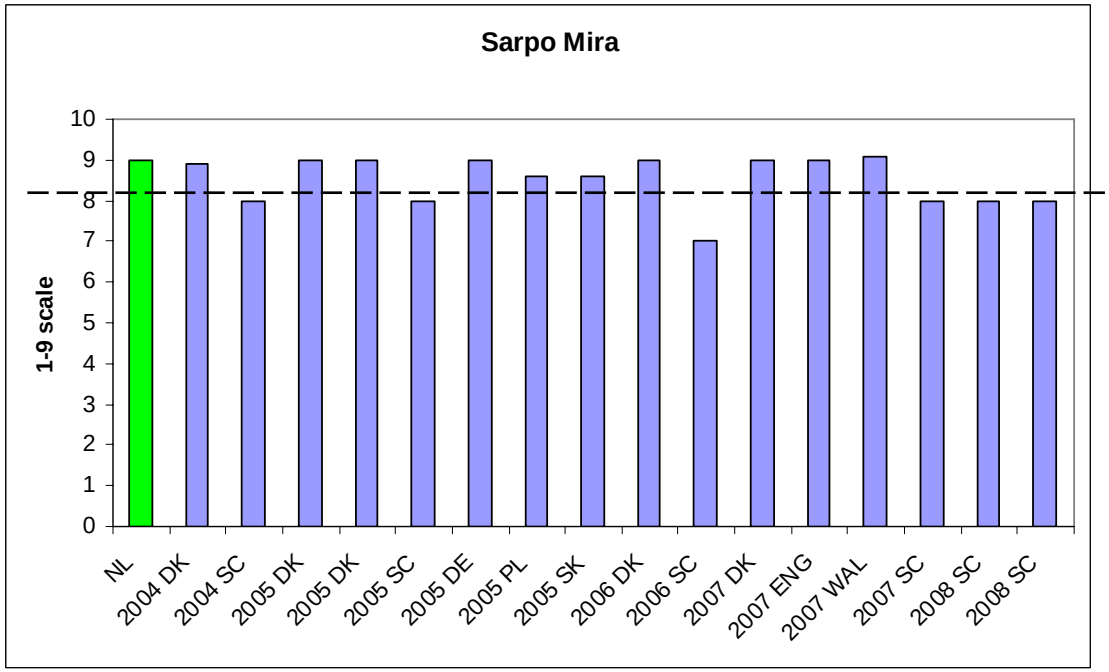

# Resistance of 10 most widely grown cultivars in GB 2007 (x 1000 Ha) to 13_A2 represents 61% of total planted area (131, 000 Ha)



# SCRI and SASA field results 2008 – cultivars with anecdotal evidence of breakdown in resistance

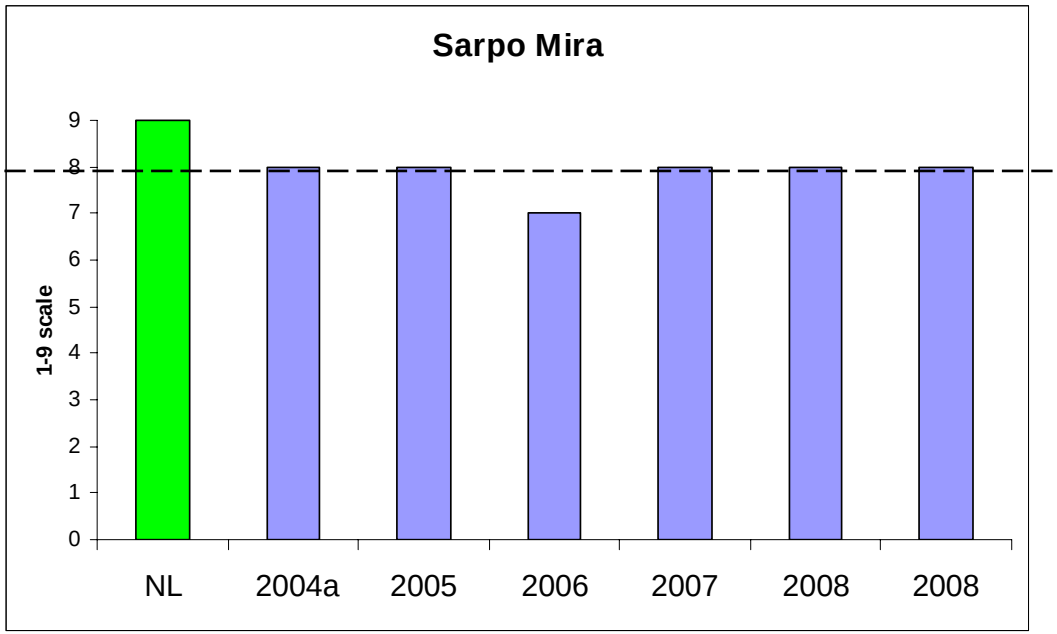





Eucablight data

Scottish data



# Conclusions

- Proportion of 13_A2 in GB population is high: remains 70-80% in 2008

Characteristics that make it dominant compared to other isolates and may have implications for management:

Survives overwinter and infects early - vigilance

Aggressive at 13ºC

(& also at much lower temperatures? Smith periods?)

Shorter latent period – cycling more quickly

Able to overcome previously resistant cultivars

Metalaxyl insensitivity

- Ensure breeding material resistant
- Watch for increased variation in population
- Ensure fungicide sensitivity