Dramatic changes within the Irish *Phytophthora infestans* population during the 2008 and 2009 seasons

Steven Kildea

LR Cooke, L Quinn, C Armstrong, G Little, F Hutton, LJ Dowley & D Griffin

Department of Agriculture, Fisheries and Food
An Roinn Talmhaíochta, Iascaigh agus Bia

eagasc
Agriculture and Food Development Authority

afbi Agri-Food and Biosciences Institute

NDP
National Development Plan 2007 - 2013

The 2009 wash-out

Teagasc untreated blight trial 10th July

The 2009 wash-out

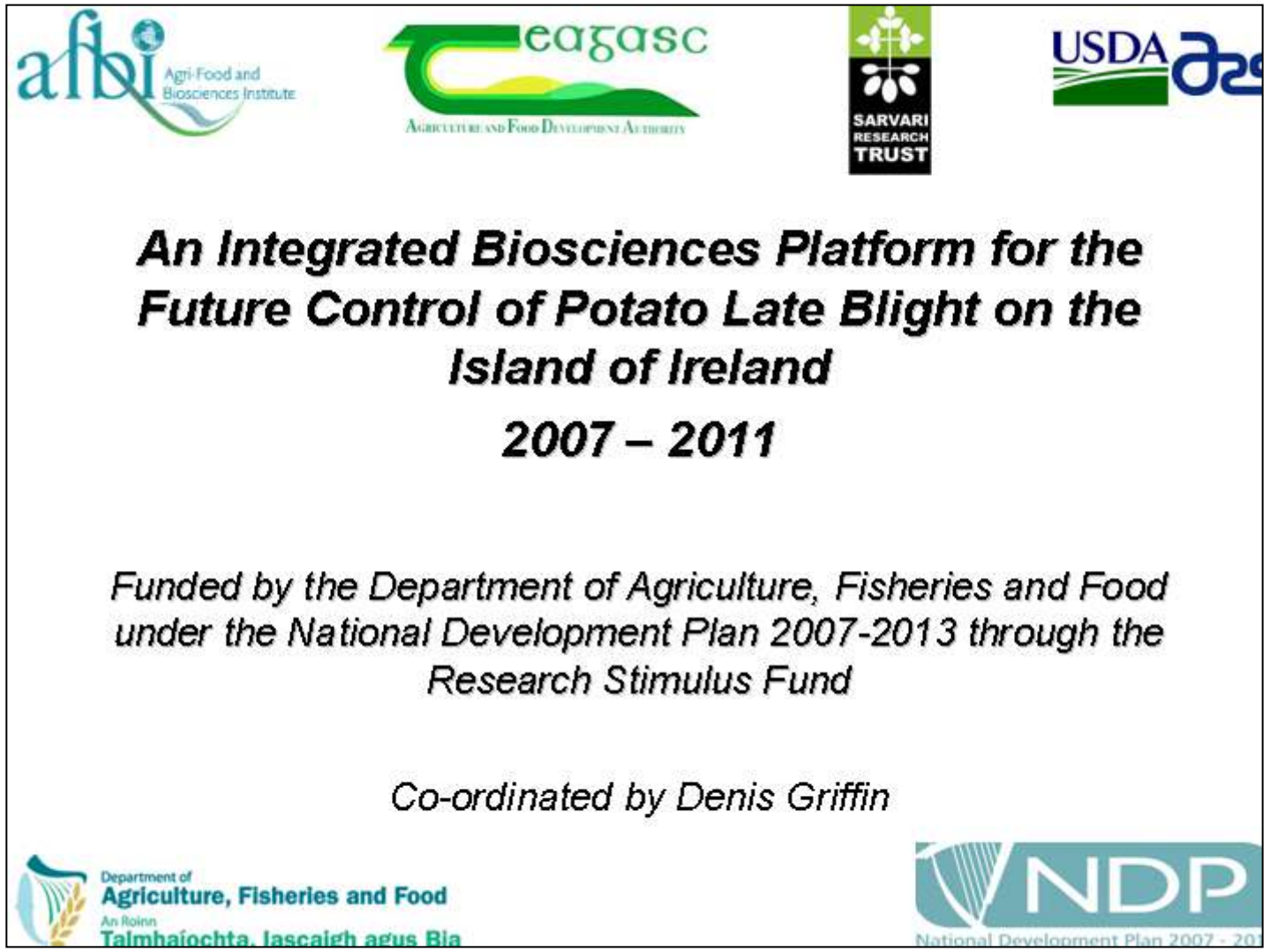
Teagasc untreated blight trial 27th July

Where we were pre-2008

- Relatively stable population
  - Dominated by two A1 strains*
  - Phenylamide resistance present but manageable
  - Disease control generally not too problematic
- Always aware of potential to change
  - A2 mating types there a very low frequency
- Recent changes in the UK population
  - Irish population has tended to mimic UK population

*Griffin et al. 2002; Cooke et al. 2006

The National Survey



Sample Collection

Department Inspectors

Teagasc Advisors

Oak Park

Ourselves

Farmers

General Public

Sample Collection

DARD Inspectors

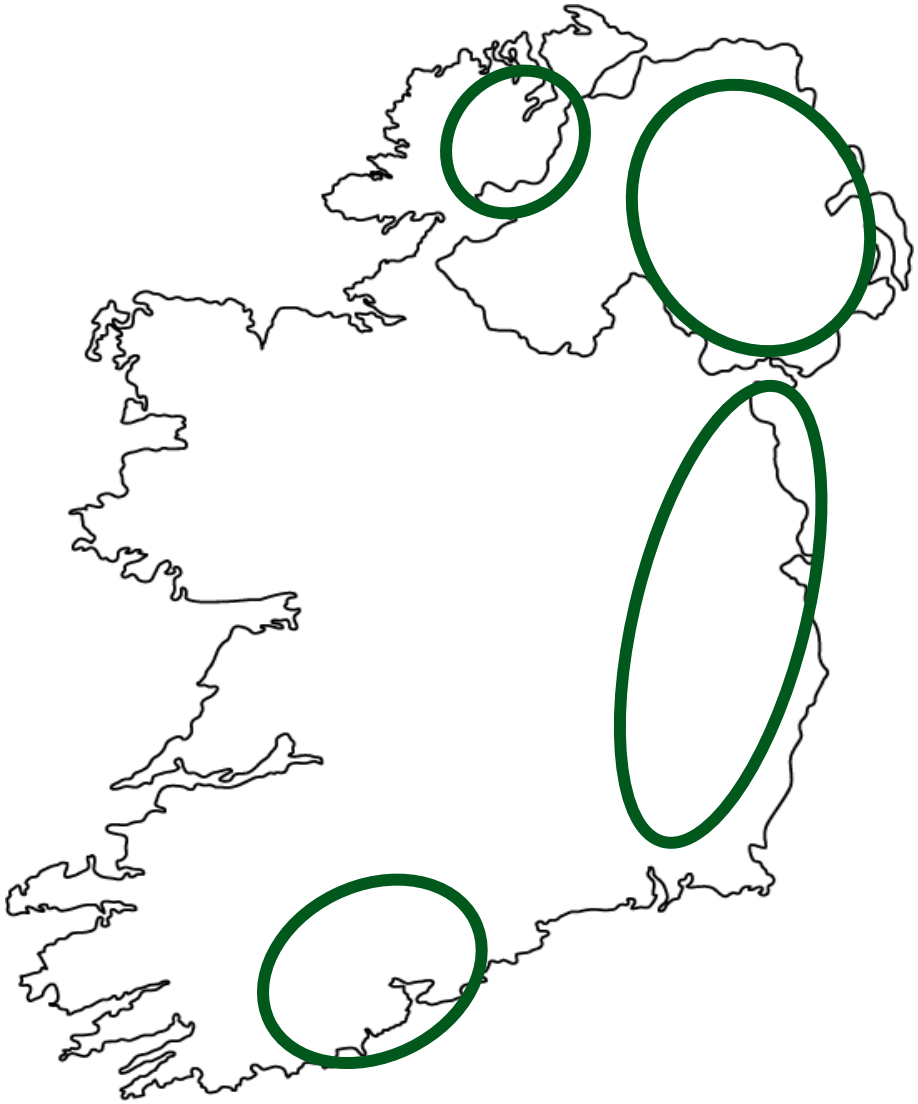
Newforge

AFBI

General Public

Farmers

Sample Collection

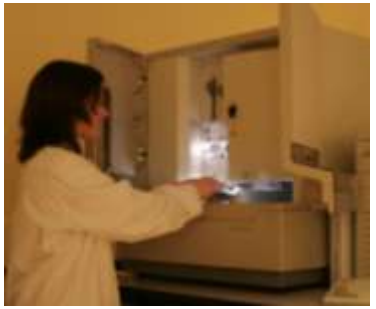


- **Commercial crops**
- Dumps
- Volunteers
- Gardens

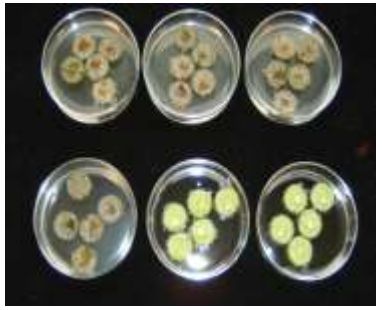
Sample Analysis

Sample isolation

Mating type



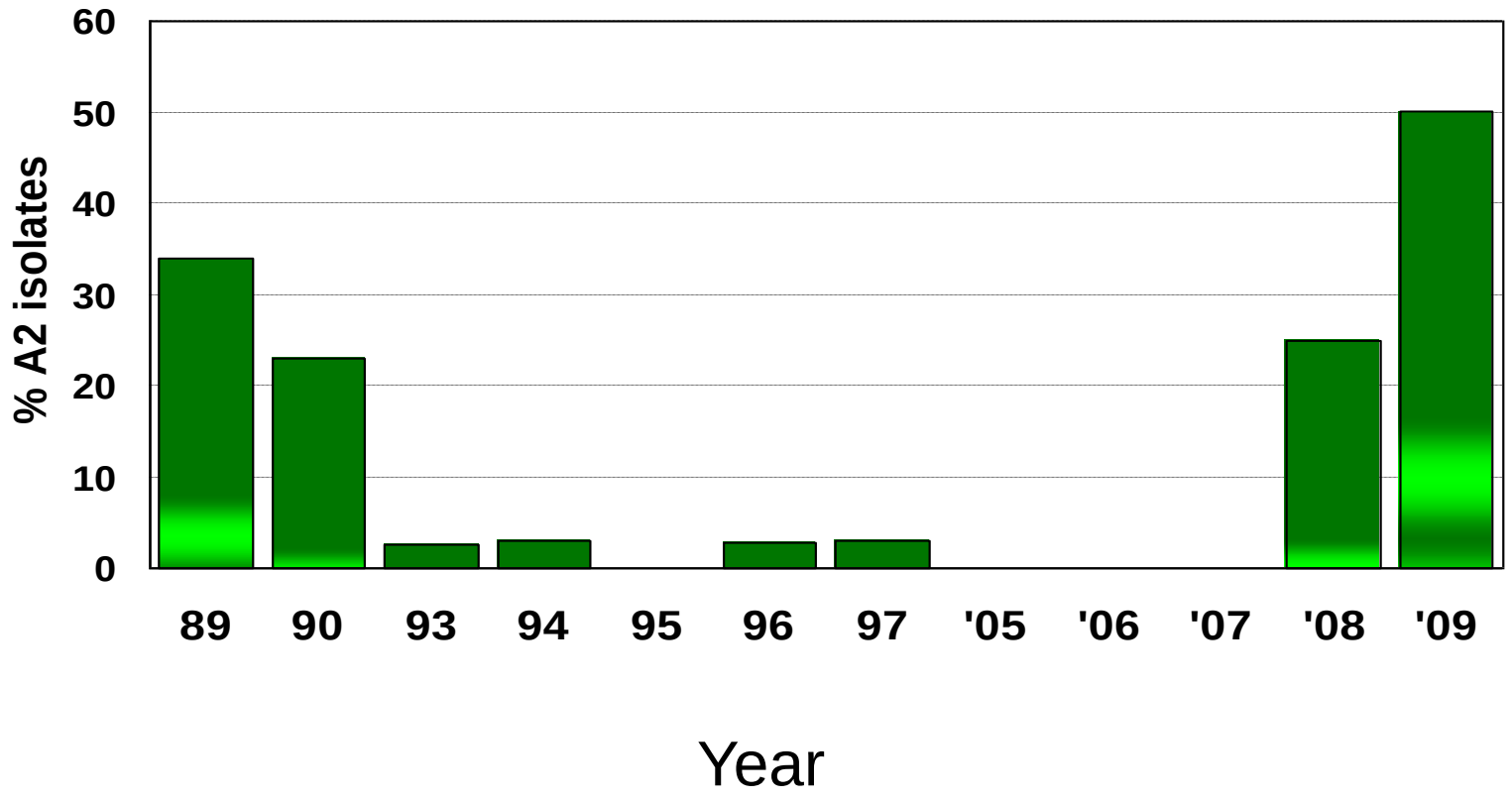
DNA Fingerprinting



Metalaxyl sensitivity

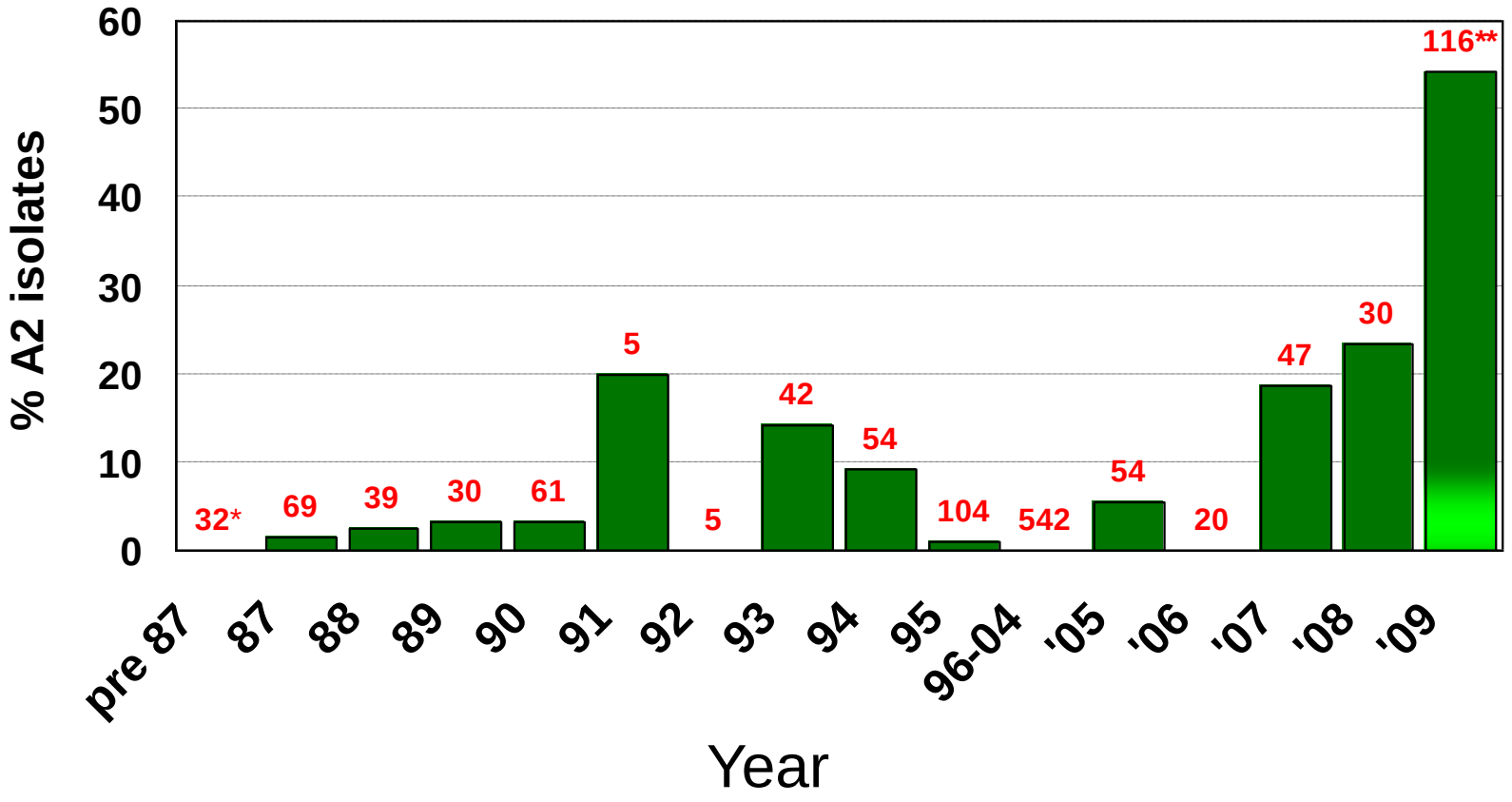
Change in mating type

Mating type Rep. Ireland

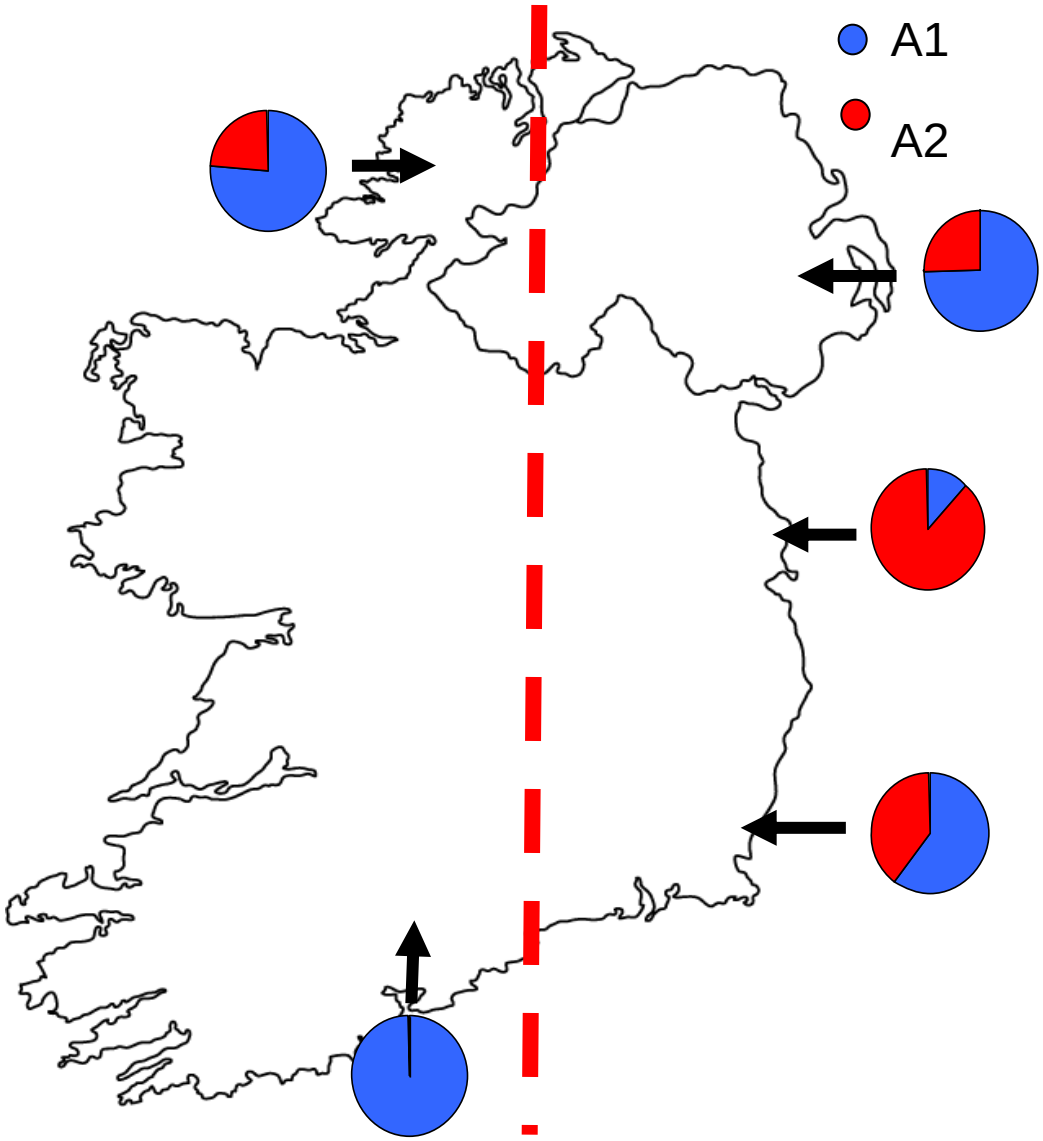


Change in mating type

Mating type N. Ireland



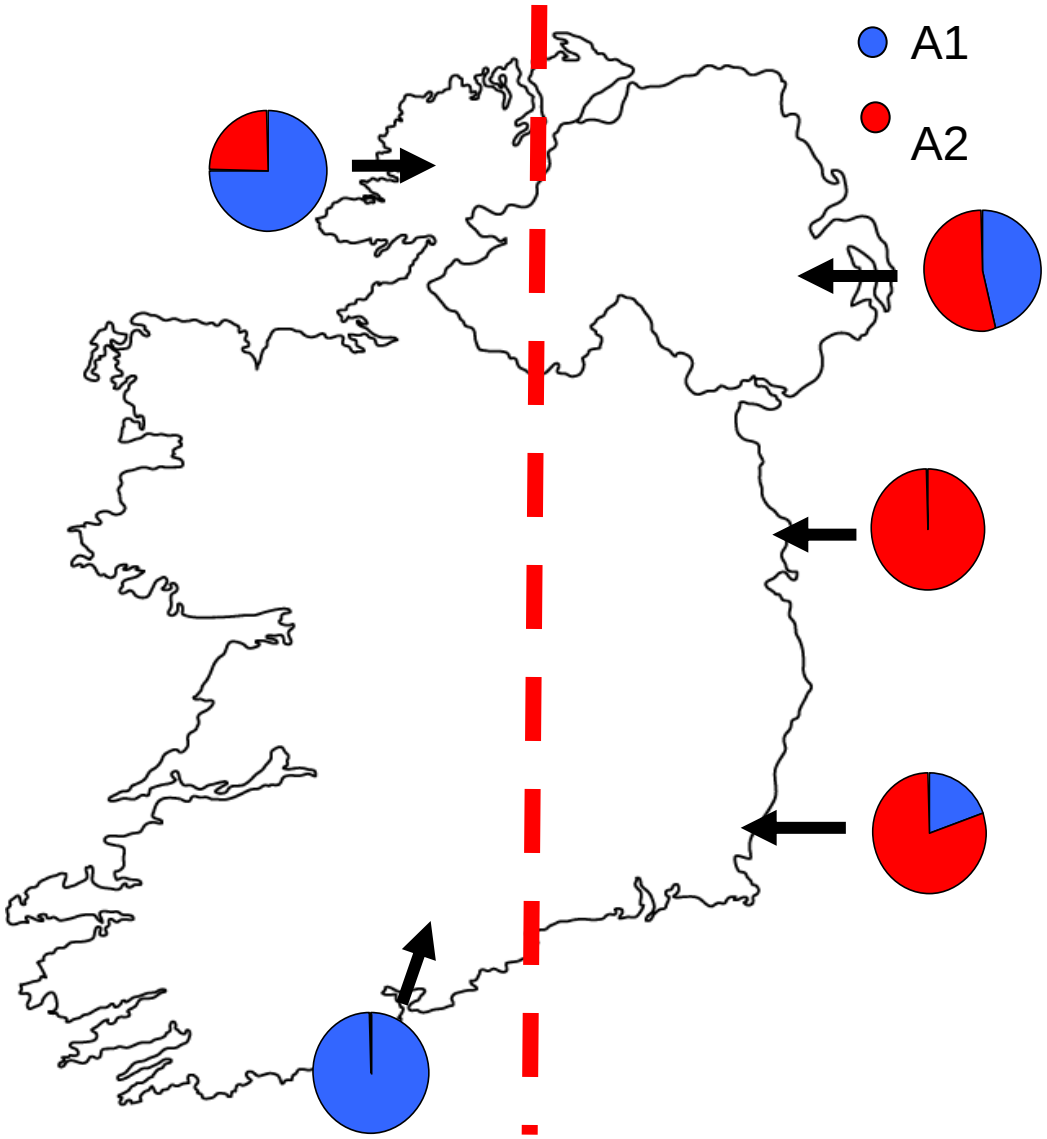
2008 Collection



- Dramatic changes in mating type frequency
- NI increased A2
- East-West Divide
- A1's detected early season in East
- Both mating types detected in same fields

ROI	43 sites	203 isolates
NI	12 sites	31 isolates

2009 Collection

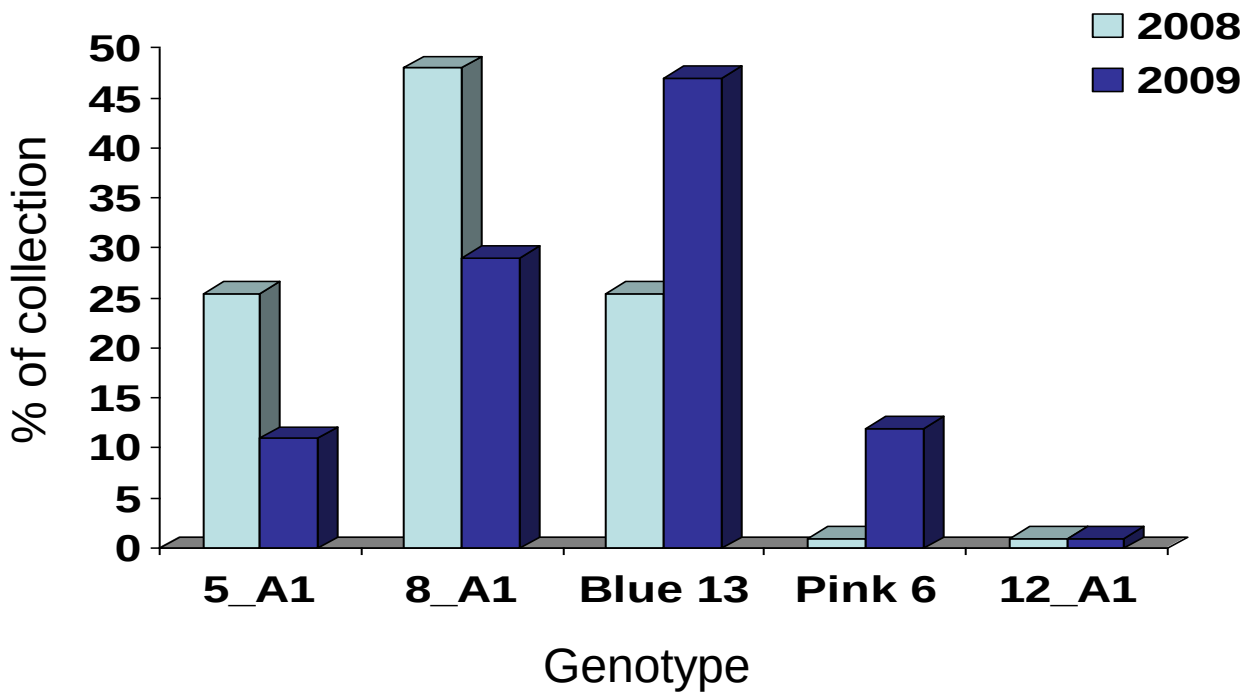


- Further increase in A2
- East-West Divide
- A2 detected from start of season
- Both mating types detected in same fields

ROI	48 sites	266 isolates
NI	45 sites	159 isolates

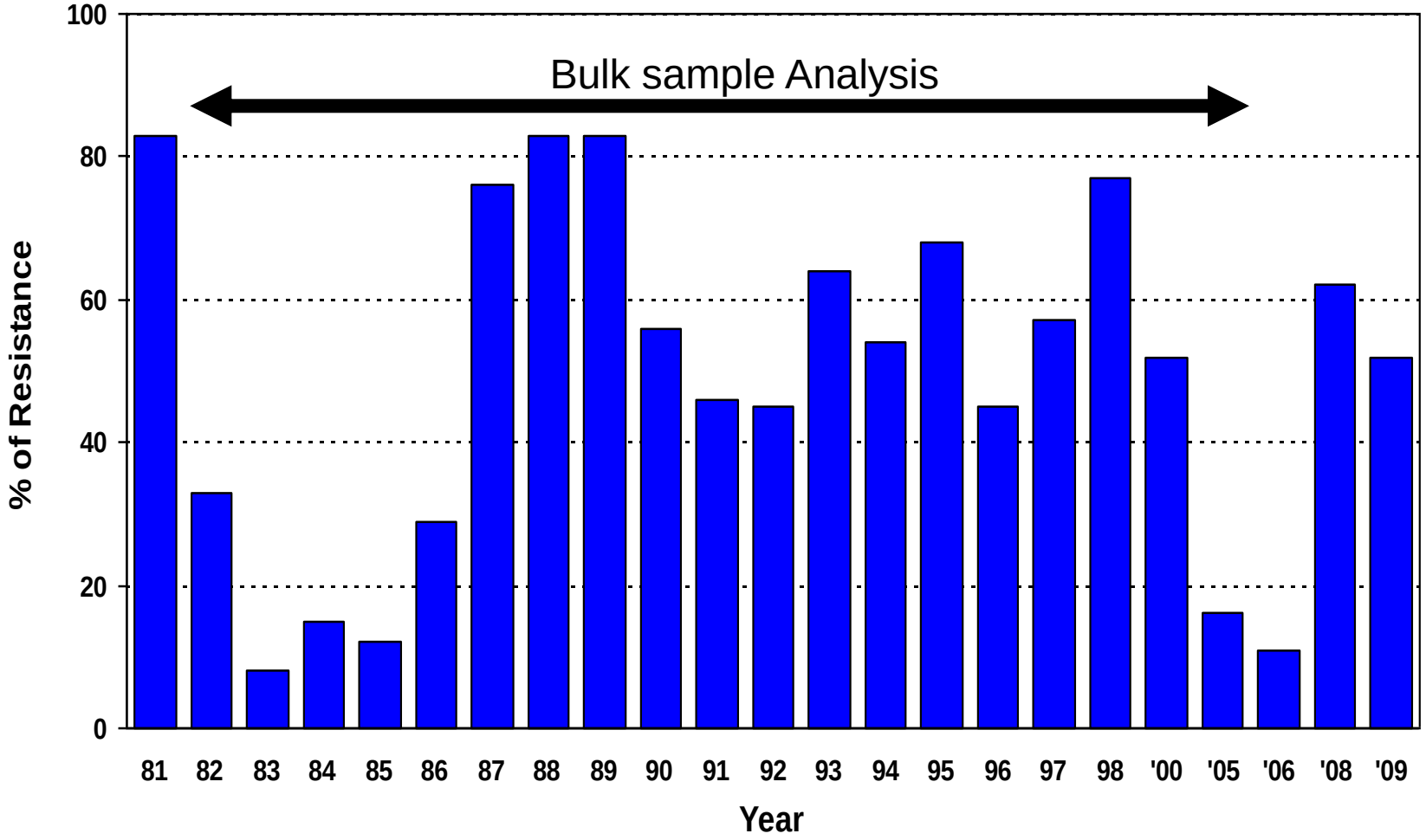
Genetic fingerprinting of strains

- Extremely limited diversity within Irish *P. infestans* population
- Only five genotypes have been detected and frequency of each is changing

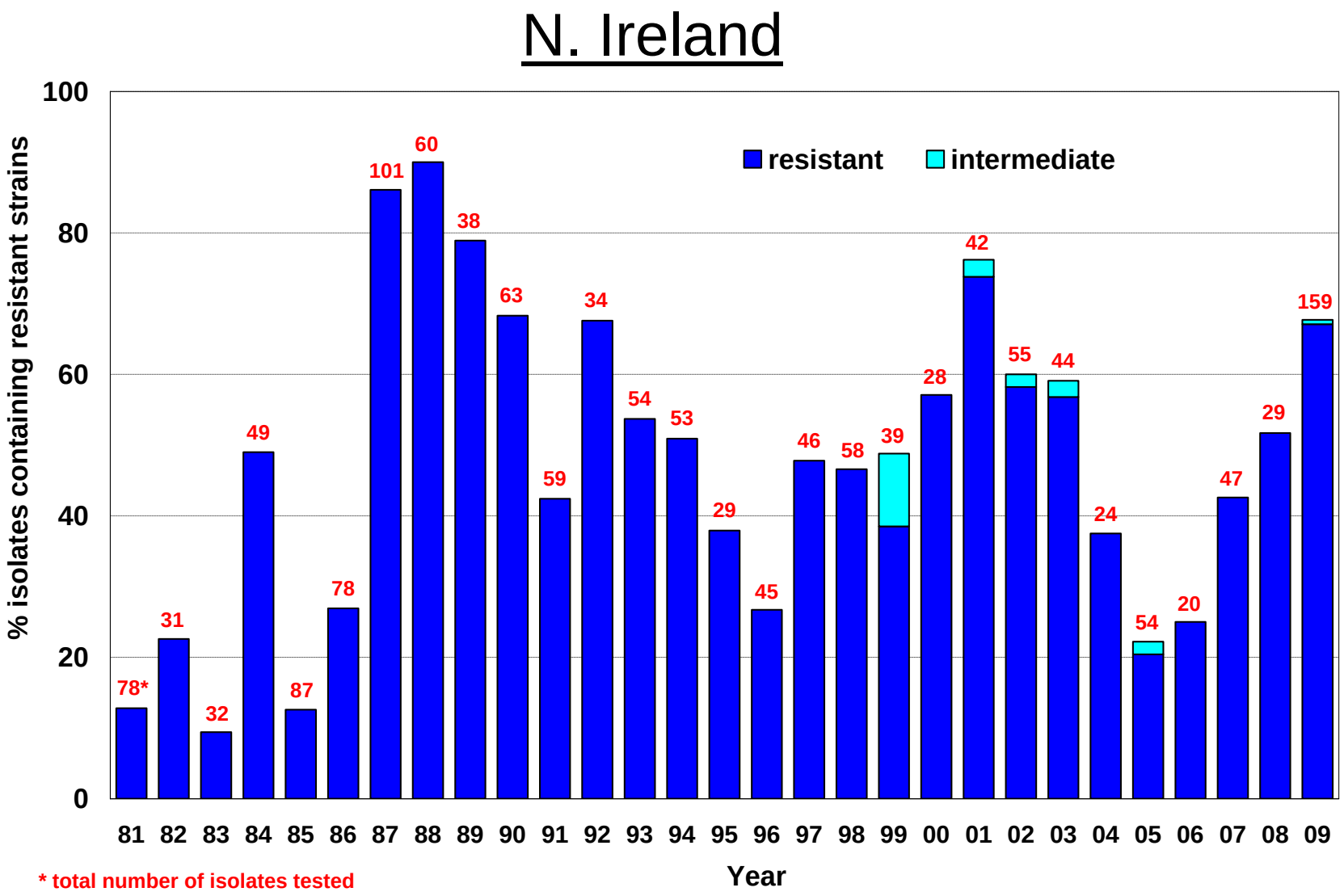


Phenylamide Sensitivity

Rep. Ireland



Phenylamide Sensitivity



Consequences of these changes

Phenylamide Resistance

- All Blue-13 tested to date are phenylamide resistant
- Pink-6 isolates tested have all been sensitive to date

2009: Two applications at most + Tight spray interval if using

2010: Benefits of using phenylamides is questionable

2011 onwards: Will population change again?

Consequences of these changes

A1 and A2 present in population

No evidence that oospores are contributing to field inoculum

Long lived spores

- Early infections
- Increased inoculum

Genetic recombination

- Increased virulence
- Fungicide resistance

Need to be aware of this possibility!

Concluding remarks on changes

- Irish blight population has undergone a dramatic change in last two years
- Changes due to emergence of the A2 strain Blue 13
- Emergence of new A1 strain ‘Pink 6’ in Donegal will need to be closely watched
- Changes are affecting how we control disease

Concluding remarks on changes

- Need increased awareness of blight
- Phenylamide resistance will continue to be monitored
  - Don’t expect to change for foreseeable future
- Possibility of oospore infections in coming years

Acknowledgements

Sample collection

Sample collection

Funding

Sample collection

Characterisations

Sample collection

David Cooke & Alison Lees
assistance with genotyping