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

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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

An Integrated Biosciences Platform for the Future Control of Potato Late Blight on the Island of Ireland
2007 – 2011

Funded by the Department of Agriculture, Fisheries and Food under the National Development Plan 2007-2013 through the Research Stimulus Fund

Co-ordinated by Denis Griffin
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

Year

% A2 isolates

89 90 93 94 95 96 97 '05 '06 '07 '08 '09

Year
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

<table>
<thead>
<tr>
<th>ROI</th>
<th>43 sites</th>
<th>203 isolates</th>
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<tbody>
<tr>
<td>NI</td>
<td>12 sites</td>
<td>31 isolates</td>
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2009 Collection

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

<table>
<thead>
<tr>
<th>ROI</th>
<th>48 sites</th>
<th>266 isolates</th>
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<tbody>
<tr>
<td>NI</td>
<td>45 sites</td>
<td>159 isolates</td>
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Genetic fingerprinting of strains

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

* total number of isolates tested
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

Sample collection

Sample collection

Characterisations

Funding

David Cooke & Alison Lees assistance with genotyping