Evaluation of fluopicolide-containing formulations for the control of potato late blight in Northern Ireland

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Late blight in Northern Ireland

- Weather conditions favour blight in most years
- 8-9 fungicide applications per season
- Fungicide costs c. £1 million (€1.5 million)
- Estimated yield loss 5%
- Tuber blight potentially a major problem
Fluopicolide

- Novel chemistry developed by Bayer
- Placed by FRAC in a new mode of action group
- Interferes with functioning of spectrin, which is involved in stabilising the cytoskeleton
- Oomycete-specific
- Translaminar activity
- Launched in 2006 for late blight control as ‘Infinito’, a co-formulation with propamocarb hydrochloride
Field trials 2003-2006

- Conducted at Newforge, Belfast on cv. Up-to-Date
- 4-drill plots (10 tubers/drill)
- 5 replicate blocks
- Trials planted early-mid May
Infector drills
Plot number
Treatment nos. (randomised within blocks)

Numbers of blank drills: 2, 4, 4, 2, 4, 2, 4, 4, 2, 4, 2

BLOCK I:
3-8, 13-16, 21-26, 29-34, 39

BLOCK II:
1-2, 3-4, 5-6, 12-13

BLOCK III:
10-11, 14-15, 17-18

BLOCK IV:
22-23, 24-25, 27-28

BLOCK V:
20-21, 26-27, 29-30
Field trials 2003-2006

- Infector drills inoculated with 50/50 phenylamide-resistant/sensitive N. Ireland P. infestans isolates in early July
- Mist irrigated morning and evening to encourage infection
Over-view of trial and close-up of inoculated plants, 9 July 2003
Field trials 2003-2006

- Fungicide programmes started in mid-late June (before inoculation) and continued until desiccation
- All sprays applied at 7-d intervals
- Standard programme in all trials:
  - 2 x ‘Fubol Gold’ (1.9 kg/ha; 76 g metalaxyl-M + 1216 g mancozeb/ha)
  - 8 x ‘Shirlan’ (300 ml/ha; 150 g fluazinam/ha)
- Plots assessed twice weekly after inoculation
- Desiccation beginning of September
- Harvesting late September – early October
Inoculated infector drills, 13 August 2004
Dead infector drills alongside treated plots, 29 August 2003
Field trials 2003-2006

- Post-harvest assessments:

- Graded yield (>35, 35-55, >55 mm tubers and soft-blighted tubers) assessed October-November

- Remaining healthy tubers >35 mm stored and tuber blight assessed:
  - November-December
  - January-February
Field trials 2003, 2004

- Standard programme:
  - 2 x ‘Fubol Gold’
  - 8 x ‘Shirlan’

- Compared with:
  - 2 x ‘Fubol Gold’
  - 5 x ‘Shirlan’
  - 3 x ‘Infinito’ (1.4 l/ha; 87.5 g fluopicolide + 875 g propamocarb/ha)
Field trials 2005, 2006

- **Standard programme:**
  - 2 x ‘Fubol Gold’
  - 8 x ‘Shirlan’

- **Compared with:**
  - 2 x ‘Fubol Gold’
  - 2 x ‘Shirlan’
  - 3 x ‘Infinito’ (1.6 l/ha; 100 g fluopicolide + 1000 g propamocarb/ha)
  - 3 x ‘Shirlan’
  - 2 x ‘Fubol Gold’
  - 5 x ‘Shirlan’
  - 3 x ‘Infinito’ (1.4 l/ha; 87.5 g fluopicolide + 875 g propamocarb/ha)
The ‘Infinito’ programme plots had significantly less foliage blight than the standard programme at the final assessments.
The ‘Infinito’ programme plots had significantly less foliage blight than the standard programme in the later assessments.
2005 trial: Foliage blight assessments

The mid-season 1.6 l/ha ‘Infinito’ programme resulted in significantly less foliage blight than the standard programme in the later assessments.
The two ‘Infinito’ programmes resulted in significantly less foliage blight than the standard programme in the final assessments.
Dead infector drills and treated plots, 14 August 2006
‘Fubol Gold’/‘Shirlan’-treated plot, 14 August 2006
‘Fubol Gold’/‘Infinito’/‘Shirlan’-treated plot, 14 August 2006
In both years, the ‘Infinito’ programmes resulted in a slightly greater marketable yield and a lower weight of blighted tubers than the standard programme.
The mid-season ‘Infinito’ programme resulted in a greater marketable yield than the standard programme in 2005, but not 2006 when yields were much lower.
2003 & 2004 trials: Tuber blight assessments (% by number)

The ‘Infinito’ programme resulted in a lower percentage of blighted tubers.
The end-of-season ‘Infinito’ programme resulted in fewer blighted tubers than the standard in both years; the mid-season one had less blight in 2005, but not in 2006.
Field trials 2003-2006

Analysed over years, the programme ending with ‘Infinito’ 1.4 l/ha (the only ‘Infinito’ programme used every year) achieved significantly:

- Better foliage blight control than the standard
- Better tuber blight control than the standard
- Greater marketable yield than the standard

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Foliage blight (% ang. trans.)</th>
<th>AUDPC</th>
<th>Tuber blight (% ang. trans.)</th>
<th>Marketable yield (kg/plot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fubol/Shirlan</td>
<td>35.4</td>
<td>384</td>
<td>14.8</td>
<td>48.7</td>
</tr>
<tr>
<td>Fubol/Shirlan/Infinito</td>
<td>25.5</td>
<td>256</td>
<td>12.9</td>
<td>50.3</td>
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<tr>
<td>LSD (P&lt;0.05)</td>
<td>3.98**</td>
<td>105.4*</td>
<td>1.80*</td>
<td>1.09*</td>
</tr>
</tbody>
</table>
Field trials 2005-2006

- Comparing the programmes:
  - ‘Infinito’ mid-season (at 1.6 l/ha)
  - ‘Infinito’ at the end of the season (at 1.4 l/ha)
- ‘Infinito’ performed better mid-season in 2005
- ‘Infinito’ performed better end-of-season in 2006
- In 2006, high rainfall favouring tuber infection occurred late season
- The positioning of ‘Infinito’ applications within the spray programme needs to take account of the seasonal timing of infection pressure
Conclusions

- In trials comparing ‘Infinito’ with a very robust standard programme under conditions of severe infection pressure, it consistently gave:
  - superior foliage blight control
  - excellent tuber blight control
  - improved marketable yields
- ‘Infinito’ offers Northern Ireland growers a very useful additional weapon to combat late blight
Acknowledgements

This work would not have been possible without the help of:

- Mark Wilson, John Saulters & AFBI field staff
- QUB summer students