Disease control strategies in Europe

Huub Schepers
Control strategies in Europe

- Control strategy
  - Primary inoculum sources
  - Resistant varieties
  - Fungicides
  - DSS
  - Sprayer tracks
- ENDURE-NoE
- Conclusions
Late Blight in Europe in 2007

Fungicides in short supply as disease hits

Krautfäulejahr 2007

Dr. Karsten Osmers, LWK Niedersachsen, Bezirksstelle Emsland

(Foto: AgroConcept)
NL - Phytophthora 2002-2007

Cumulative ProPhy disease pressure 62 stations

- 2005
- 2004
- 2003
- 2002
- 2006
- 2007

Date:
- 1-mei
- 1-jun
- 1-jul
- 1-aug
- 1-sep
- 1-okt

Pressure:
- 0
- 100
- 200
- 300
- 400
- 500
- 600
- 700
- 800
- 900
- 1000
- 1100
- 1200
Infected seed

Dumps

Oospores

Infected fields
Primary sources

- Dumps, volunteers, oospores, early crops, excessive infections
- Climate change influences survival of tubers in winter
- Crop rotation: oospores!
- Regulation in NL, Fight for Blight Campaign in UK
Monitoring infected fields in Europe
Dumps: Regulation in NL

Photo: Belchim Crop Protection
Resistant varieties

![Graph showing the percentage of blighted foliage over time for different varieties. The x-axis represents time in days post inoculation, ranging from 0 to 30. The y-axis represents the percentage of blighted foliage, ranging from 0 to 100. The graph shows distinct lines for each variety: Agria, Aziza, Bimonda, Ditta, Pimpernel, Remarka, and Sante. Each variety has a unique symbol and color, indicating the progression of blighted foliage over time.]
Foliar resistance & fungicide dose rate

dosis-response grafiek 2004 consumptierassen

- Exponentieel (Bintje (3))
- Exponentieel (Remarka (6.5))
- Exponentieel (Aziza (7.5))
- Exponentieel (Santé (4.5))
- Exponentieel (Agria (5.5))
Spray schedule in seed potatoes (Slootdorp, 2007)

Slootdorp

<table>
<thead>
<tr>
<th>Date</th>
<th>Spunta 0.4</th>
<th>Agria 0.3</th>
<th>Kondor 0.2</th>
<th>Agria 0.4</th>
<th>Agria 1.5</th>
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<tr>
<td>6-6</td>
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<td></td>
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<td>20-6</td>
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<td>4-7</td>
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<tr>
<td>11-7</td>
<td></td>
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<td>18-7</td>
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</tr>
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<td>2-8</td>
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<td>8-8</td>
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<td>22-8</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

aantasting (%)
Number of sprays in Europe (EuroBlight)
Control strategy

- More and more fungicides have a limited number of treatments on the label.
- Use fungicides in those conditions (*growth stage*, *disease pressure*) in which their strong characteristics are used in the best possible way.
### Fungicide Comparison

**EuroBlight**

**EU.NET.ICP & EUCABLIGHT**

**Potato Late Blight Network For Europe**

Fungicide comparison - Updated 15 May 2007

The effectiveness of fungicide products/co-formulations for the control of *P. infestans* based on the highest rate registered in Europe. These ratings are the opinion of the Fungicides Sub-Group (independent scientists and representatives from the crop protection industry) at the Bologna late blight workshop, 2007 and are based on field experiments and experience of the products performance when used in commercial conditions.

<table>
<thead>
<tr>
<th>Product</th>
<th>Leaf Blight</th>
<th>Effectiveness</th>
<th>Mode of action</th>
<th>Rainfastness</th>
<th>Mobility in the plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>copper</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact</td>
</tr>
<tr>
<td>chlorothalonil</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact</td>
</tr>
<tr>
<td>propiconazole</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact</td>
</tr>
<tr>
<td>fludioxonil</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact</td>
</tr>
<tr>
<td>zoxamide + mancozeb</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact</td>
</tr>
<tr>
<td>famoxadone + cyprodinil</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
<tr>
<td>benalaxyl + mancozeb</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
<tr>
<td>cyprodinil + mancozeb</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
<tr>
<td>cyprodinil + metiram</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
<tr>
<td>dimethomorph + mancozeb</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
<tr>
<td>fenamidone + mancozeb</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
<tr>
<td>benalaxyl + mancozeb</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
<tr>
<td>metalaxyl-M + mancozeb</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
<tr>
<td>metalaxyl-M + fludioxonil</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
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<tr>
<td>propanamide-HCl + mancozeb</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
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<tr>
<td>propanamide-HCl + chlorothalonil</td>
<td>?</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>propanamide-HCl + fenamidone</td>
<td>?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>contact + transaminar</td>
</tr>
</tbody>
</table>

1. The scores of individual products are based on the label recommendation and are NOT additive for mixtures of active ingredients. Inclusion of a product in the list is NOT indicative of its registration status either in the EU or elsewhere in Europe.  
2. Includes maneb, mancozeb, propaneb and metiram.  
3. See proceedings for comments on phenylamide resistance.  
4. Based on limited data.

Key to ratings: 0 = no effect; 0 = reasonable effect; 0 = good effect; 0 = very good effect; N/A = not recommended for control of tuber blight; ? = no experience in trials and/or field conditions.

Whilst every effort has been made to ensure that the information is accurate, no liability can be accepted for any error or omission in the content of the tables or for any loss, damage or other accident arising from the use of the fungicides listed herein. Omission of a fungicide does not necessarily mean that it is not approved for use within one or more EU countries.
### Aardappelen

**Ziekte- en plaagbestrijding, 1% drift**

| Middel            | Toe-passings-tijdstip | Advised dosering | Kg active stof | Milieu-effecten | Nuttige organismen
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
<td>kg/ha of l/ha kg a.s./ha</td>
<td></td>
<td></td>
<td>organische stofklassen</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1,5-3% 3-6% 6-12%</td>
<td>Groundwater Water-leven Lucht Bestuivers Bestrijders</td>
</tr>
<tr>
<td><strong>Grondwater</strong></td>
<td></td>
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<tr>
<td><strong>Water-leven</strong></td>
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<td><strong>Lucht</strong></td>
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<td><strong>Bestuivers</strong></td>
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<td><strong>Bestrijders</strong></td>
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</tr>
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</table>

**Phytophthora**

- Acrobat
  - T: aug
  - D: 2
  - 1.49
  - 138 44 44 2 0.02
  - A
  - B

- Acrobat
  - T: sept-feb
  - D: 2
  - 1.49
  - 560 44 44 2 0.00
  - A
  - B

- Aviso
  - T: aug
  - D: 3
  - 1.85
  - 171 57 57 3 0.16
  - A
  - B

- Aviso
  - T: sept-feb
  - D: 3
  - 1.85
  - 690 57 57 3 0.10
  - A
  - B

- Curazine
  - T: aug
  - D: 2.5
  - 1.81
  - 170 55 55 3 0.03
  - A
  - B

- Curazine
  - T: sept-feb
  - D: 2.5
  - 1.81
  - 700 56 56 3 0.01
  - A
  - B

- Cymoxanil-M
  - T: aug
  - D: 2.5
  - 1.74
  - 163 53 53 3 0.03
  - A
  - B

- Cymoxanil-M
  - T: sept-feb
  - D: 2.5
  - 1.74
  - 675 53 53 3 0.01
  - A
  - B

- Daconil
  - T: aug
  - D: 3
  - 1.50
  - 249 3 0 6 0.23
  - A
  - A

- Daconil
  - T: sept-feb
  - D: 3
  - 1.50
  - 297 3 0 6 0.14
  - A
  - A

- Fubol gold
  - T: aug
  - D: 2.5
  - 1.70
  - 400 53 53 3 0.06
  - ?
  - ?

- Fubol gold
  - T: sept-feb
  - D: 2.5
  - 1.70
  - 1100 53 53 3 0.03
  - ?
  - ?

- mancozeb 75 %
  - T: aug
  - D: 2
  - 1.50
  - 150 50 50 2 0.02
  - A
  - B

- mancozeb 75 %
  - T: sept-feb
  - D: 2
  - 1.50
  - 620 50 50 2 0.00
  - A
  - B

- mane 75 %
  - T: aug
  - D: 2
  - 1.50
  - 150 50 50 2 0.02
  - A
  - B

- mane 75 %
  - T: sept-feb
  - D: 2
  - 1.50
  - 620 50 50 2 0.00
  - A
  - B

- Ranman
  - T: aug
  - D: 0.2
  - 0.08
  - 0 0 0 13 0.01
  - ?
  - ?

- Ranman
  - T: sept-feb
  - D: 0.2
  - 0.08
  - 0 0 0 13 0.00
  - ?
  - ?

- Sereno, 90% driftreductie
  - T: aug
  - D: 1.25
  - 0.75
  - 213 36 21 1 0.01
  - ?
  - ?

- Sereno, 90% driftreductie
  - T: sept-feb
  - D: 1.25
  - 0.75
  - 850 48 21 1 0.00
  - ?
  - ?

- Sereno, 90% driftreductie
  - T: aug
  - D: 1.5
  - 0.90
  - 256 44 26 1 0.01
  - ?
  - ?

- Sereno, 90% driftreductie
  - T: sept-feb
  - D: 1.5
  - 0.90
  - 1020 57 26 1 0.00
  - ?
  - ?

- Shirian
  - T: aug
  - D: 0.2
  - 0.10
  - 0 0 0 7 0.04
  - A
  - A

- Shirian
  - T: sept-feb
  - D: 0.2
  - 0.10
  - 0 0 0 7 0.02
  - A
  - A

- Shirian
  - T: aug
  - D: 0.4
  - 0.20
  - 0 0 0 14 0.08
  - A
  - A

- Shirian
  - T: sept-feb
  - D: 0.4
  - 0.20
  - 0 0 0 14 0.05
  - A
  - A

- Tanos, 90% driftreductie
  - T: aug
  - D: 0.6
  - 0.30
  - 0 0 0 4 0.03
  - ?
  - ?

- Tanos, 90% driftreductie
  - T: sept-feb
  - D: 0.6
  - 0.30
  - 0 0 0 4 0.02
  - ?
  - ?

- Tactic-C
  - T: aug
  - D: 1.75
  - 1.31
  - 109 2 0 4 0.20
  - A
  - A

- Tactic-C
  - T: sept-feb
  - D: 1.75
  - 1.31
  - 130 2 0 4 0.12
  - A
  - A

- Tactic-C
  - T: aug
  - D: 2.7
  - 2.03
  - 167 3 0 5 0.30
  - A
  - A

- Tactic-C
  - T: sept-feb
  - D: 2.7
  - 2.03
  - 183 3 0 5 0.18
  - A
  - A
DSS in Europe
Effect extreme rainfall

(Source: PRI)
Adaptation sprayer tracks

Conventional sprayer track

- Bandbreedte = 52 cm
- Spoorbreedte = 1.50 m
- 80 - 83 %
- 3 m spruiten invloed

Adapted sprayer track

- Bandbreedte = 52 cm
- Spoorbreedte = 2.08 m
- 100 %
- 97 %
- 4.5 m spruiten invloed
Societal expectations for safe food and environmentally friendly agriculture

Area 5.4.6 - Safer and environmentally friendly production methods and technologies and healthier food stuffs. **Topic 1** - Reducing the use of plant protection products.

**EC Contribution**

11,2 M €

**End-users**

(farmers, advisers), industry, policy-makers, society at large…

**Crop protection: fragmented scientific knowledge and R&D community**

**European Network for DURable Exploitation of crop protection strategies**
Consortium composition

Research
- INRA - FR
- BBA - DE
- RRES - UK
- CIRAD - FR
- CNR - IT
- AGROS - CH
- WUR - NL
- IHAR - PL

Education & R
- SSSUP - IT
- SZIE - HU
- UdL - SP
- AU - DK

Extension
- DAAS - DK
- ACTA - FR

Management
- IT - FR

Industry
- IBMA - Int.

and...
- INCO countries
DIAS est AU et non AU-FAS.
+ mise en forme DK
Vincent Troillard, 02/12/2007
Project structure

Dissemination

Optimize & reduce pesticide use

Research

Design innovative crop protection strategies

Integration

Meeting consumer, legislator, and user expectations

Multicriteria assessment

Basic knowledge

Biology of crop-pest systems

CASE STUDIES
Conclusions

- Prevention more important
- Reduced input in resistant varieties
- Targeted use of fungicides
- Timing with DSS
- Adapted sprayer tracks
- Integration in ENDURE
Thank you for your attention

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