

## Resistentiemonitoring in EuroBlight

Alternaria

Bert Evenhuis, Trudy van den Bosch & Huub Schepers




## EuroBlight


- Netwerk van onderzoekers en GBI
- Gestart met Concerted Action gericht op Phytophthora (1996)
  - Netwerk voortgezet met sponsoring GBI
- Alternaria sub – groep opgericht 2011 want Alternaria belangrijker.
  - 2 jaarlijks een bijeenkomst
  - Alternaria werkgroep komt in de tussenjaren ook bij elkaar.
- Doel meer weten over Alternaria in Europa.



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**EuroBlight**  
A potato late blight network for Europe














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## 2016 Amsterdam


Presentations from second subgroup meeting May 2016 in Amsterdam the Netherlands

Title / Author	Presentation
Current Status of QoI and SDHI Mutations in Alternaria Species in the United States / Neil Gudmestad	
Results of the F129L Monitoring 2015 in Germany, Austria and Poland / Birgit Adorf & Hans Hausladen	
Results of the Monitoring in UK / Alison K. Lees	
Monitoring data (F129L - A. solani) from Denmark / Bert Nielsen & Annemarie Fogler Justesen	
Results of the Monitoring in NL / Bert Evenhuis	
Fungicide sensitivity, QoI and SDHI resistance in the Belgian Alternaria population / Sofie Landuyt, Michiel Vandecasteele, Pieter Vanhaverbeke, Katri Demeulemeester, Bernard De Baets, Kris Audenaert, and Geert Haesaert	
Sensitivity tests in A. solani and field efficacy data from Sweden / Erlend Lijeröth	
SDHI resistance in Germany / Birgit Adorf & Hans Hausladen	
Varietal Resistance Classification & Control with Forecasting models / Kirsti Abuley	
Results Alternaria EUROBLIGHT trials 2015 / Bert Evenhuis	
Discussion Alternaria EUROBLIGHT trials 2016 and EUROBLIGHT EB Project 2016 / Hans Hausladen	



Efficacy of fungicides for the control of early blight caused by *Alternaria solani* and *Alternaria alternata*.


Product	Efficacy
azoxystrobin <sup>4</sup>	+++(+)
fluazinam	(+)
metiram/mancozeb <sup>1</sup>	++
propineb	++
chlorothalonil	+(+)
famoxadone <sup>4</sup> +cymoxanil	++
fenamidone <sup>4</sup> +mancozeb or propamocarb <sup>2</sup>	++
zoxamide+mancozeb	++(+)
pyraclostrobin <sup>4</sup> + boscalid <sup>5</sup>	+++(+)
difenoconazole + mandipropamid	+++
difenoconazole <sup>3</sup>	+++



**EuroBlight**  
A potato late blight network for Europe

**Key to ratings :** 0 = no effect ; + = some effect ; ++ =reasonable effect ; +++ = good effect ; ++++ very good effect

- > <sup>1</sup> This rating applies to products containing mancozeb when used at the highest dose rates (>1500g/ha). This rating may not be appropriate where the rate of mancozeb used is lower, particularly where the second active substance is not effective against Alternaria.
- > <sup>2</sup> In some trials there were indications that the rating was ++(+).
- > <sup>3</sup> In some trials there were indications that the rating was +++(+).
- > <sup>4</sup> *Alternaria solani* isolates that are less sensitive to QoI-fungicides have been isolated from potato plants in Europe. Therefore resistance management strategies should be implemented (see FRAC web site for details).
- > <sup>5</sup> *Alternaria solani* isolates that are less sensitive to SDHI-fungicides have been isolated from potato plants in some Western European countries. Therefore resistance management strategies should be implemented (see FRAC web site for details).



Ratings will be lower where fungicide insensitive strains are present.

The screenshot shows the EuroBlight website interface. At the top left is the EuroBlight logo with the tagline 'A potato late blight network for Europe'. A search bar is located at the top right. The main content area is titled 'Early blight fungicide table NEW' and includes a sub-header 'Efficacy of fungicides for the control of early blight caused by *Alternaria solani* and *Alternaria alternata*. Updated 31 July 2017.' Below this is a table with columns for 'Product', '14 day interval', 'Strategy', and '7 day interval'. The table lists various fungicide products and their efficacy ratings. A red arrow points to a disclaimer at the bottom of the table, which states that ratings are based on results from EuroBlight field trials and that the information is intended as a guide only.

Product	Efficacy rating <sup>1,2</sup>		
	14 day interval	Strategy	7 day interval
<b>Spray interval 14 days</b>			
mancozeb 2.0	1.7	-	-
<b>Spray strategy<sup>3</sup></b>			
(zoxamide + mancozeb) <sup>4</sup> 1.8 + azoxystrobin <sup>5</sup> 0.5 <sup>4</sup>	-	3.7	-
(zoxamide + mancozeb) <sup>4</sup> 1.8 + difenoconazole <sup>6</sup> 0.5	-	3.9	-
<b>Spray interval 7 days</b>			
mancozeb 2.0	-	-	2.5
(zoxamide + mancozeb) 1.8	-	-	2.8
(fenamidone + propanoic acid) 2.0	-	-	2.2
(fluazinam + azoxystrobin) <sup>7</sup> 0.5	-	-	3.1
(dimethomorph + mancozeb) 2.0	-	-	2.9

<sup>1</sup> Ratings for *Alternaria* are based on results from EuroBlight field trials during 2013-2016, and only compounds included in these trials are rated for *Alternaria*. The scale for *Alternaria* is a 0-9 scale (see technical report to be uploaded soon). <sup>2</sup> The ratings are intended as a guide only and will be amended in future if new information becomes available. <sup>3</sup> The active ingredients were sprayed in a spray strategy with a 7 day interval (7) or a 14 day interval (14). <sup>4</sup> azoxystrobin was sprayed at label rate which is 0.5 for DK and DE, and 0.25 for NL. <sup>5</sup> *Alternaria solani* isolates that are less sensitive to QoI-fungicides have been isolated from potato plants in Europe. Therefore resistance management strategies should be implemented (see FRAC web site for details). Rating will be lower where fungicide insensitive strains are present.

**Disclaimer:** 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 table 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. The ratings are based on the label recommendation for a particular product. Where the disease pressure is low, intervals between spray applications may be extended and, in some countries, fungicide applications are made in response to nationally issued spray warnings and/or Decision Support Systems. It is essential therefore to follow the instructions given on the approved label of a particular early blight fungicide appropriate to the country of use before handling, storing or using any early blight fungicide or other crop protection product.

## Aim monitoring

### ■ EuroBlight Brasov

- Survey of *Alternaria* isolates in Europe
- Check genotype I or II
- Check F129L mutation

### ■ Isolate collection in liquid nitrogen at Wageningen UR



## Alternaria: wissel fungiciden af

Aardappelteelaars moesten afgelopen seizoen bovengemiddeld vaak ingrijpen tegen *Alternaria*. Dat percelen desondanks vrijvroegd afsterven, kan te maken hebben met een vermindende gevoeligheid voor *Alternaria*-middelen. Daarvoor waarschuwt nu ook de nieuwe

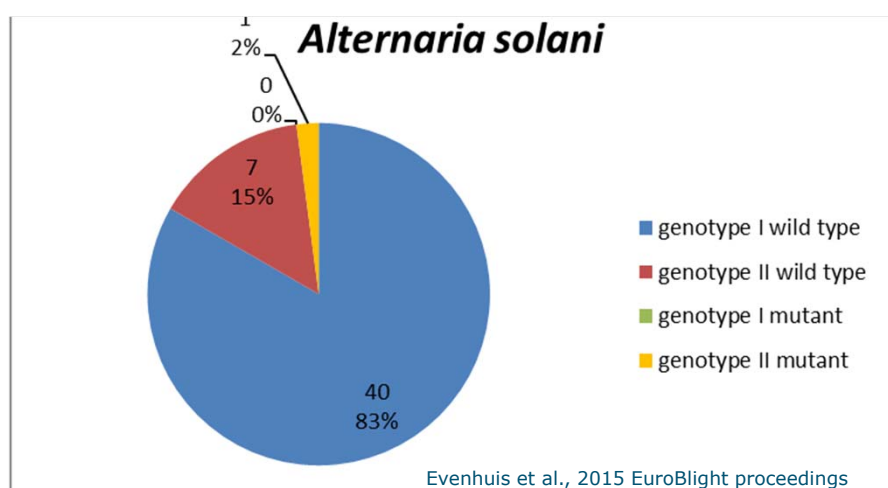


## Survey 2001-2011

- Isolaten uit vloeibare N2
- Periode 2001-2011
- 48 isolaten beschikbaar
- Analyse door Leiminger et al. TUM
- Resultaten gepubliceerd op EuroBlight bijeenkomst in 2003 en in proceedings 2005



## Alternaria populatie NL 2001-2011



## Survey EuroBlight

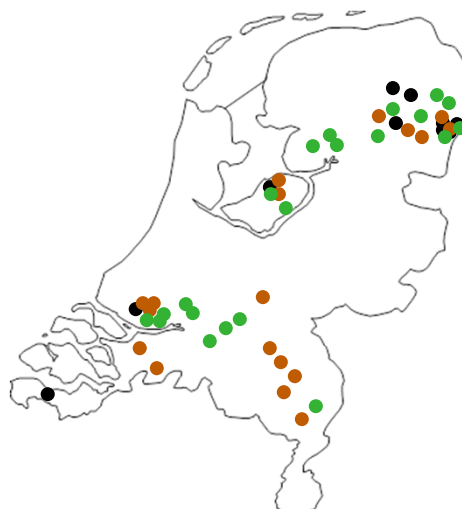
- Landen hebben eigen programma's
- *Alternaria* WG EuroBlight wil gegevens bundelen en publiceren
- BE, DE (PL, Aut), DK, NL Sve (Nor, Fin), UK
- Daarnaast zijn er nog andere survey initiatieven



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## Survey 2014 - 2016

- For *Alternaria* no regular sampling is in place
- Samples were collected
  - Field experiments
  - Practise
- Sampling may have been biased
  - 2014 ●
  - 2015 ●
  - 2016 ●



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## Method

- Leaves with lesions were sent in dry
- Alternaria solani* was isolated from the potato leaf
- DNA extracted
- 2 PCR's (Pasche et al., 2004; Leiminger et al., 2014)
- PCR product was sequenced for mutation

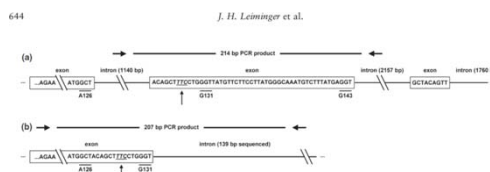
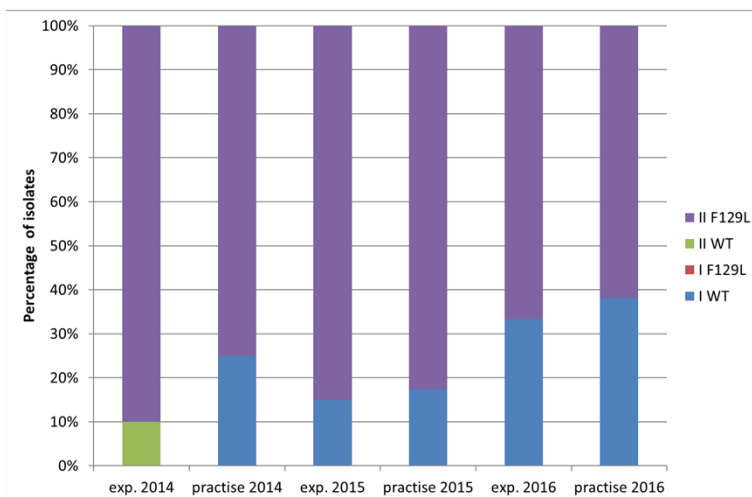


Figure 1 Schematic representation of a part of the cytochrome b gene of different German *Alternaria solani* isolates. (a) Genotype for European genotype (to genotype II or I) genotype. Arrows indicate the base triplet (underlined and in italics) which is the site of mutation in F129L mutants. A130: alanine at amino acid position 130; G131, G143: glycine at amino acid positions 131 and 143. Horizontal arrows in (a) indicate the position of primers AS-Gf and Ai-Gf used to amplify a 214 bp PCR fragment for genotyping. Horizontal arrows in (b) indicate the position of primers As-Gf and Ai-Gf used to amplify a 207 bp fragment.

## Frequentie verdeling



## Survey

- De NL survey is maar beperkt
  - In Europa uitgebreider en diverse publicaties over fungicide resistentie i.r.t. QoI (en SDHI's)
- In de survey veel isolaten van veldexperimenten
  - Is daar de druk hoger dan in de praktijk?
- Praktijkpercelen
  - Een aantal echt willekeurig
  - Sommige wellicht ingestuurd n.a.v. problemen
- Gemiddeld genomen is er geen verschil in populatie en karakterisering in veld experimenten en in praktijkpercelen

## Conclusies

- The F129L mutatie is gevonden in de NL *Alternaria solani* populatie
- Genotype II lijkt dominanter te worden t.o.v. GI
  - Associatie tussen GII en F129L, maar niet absoluut
- SDHI resistentie is melding van gemaakt (FRAC)
- Aantal beschikbare fungiciden is beperkt en zal duurzaam ingezet moeten worden
  - Middelenkeuze
  - Timing
  - Resistentie management

Tot slot

Bedankt voor uw  
aandacht

