

# EuroBlight Update 2024

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Bert Evenhuis, Ruairidh Bain, Isaac Abuley, Hans Hausladen



# Program since 2022

- Table many products not registered anymore in EU
  - Selection tool implemented
- Potato late blight
  - Foliar blight; No products added
  - Tuber blight; No products added
- BioBlight; first experiments no table

<https://agro.au.dk/forskning/internationale-platforme/euroblight/control-strategies/late-blight-fungicide-table>

Product (Dose rate [litre or kg/ha])	Leaf blight	Tuber blight	New growth	Stem blight	Protectant	Curative	Anti sporulant	Rain-fastness	Mobility	Year
cymoxanil + fluazinam									Unknown + Unknown	0
copper				●	●●	0	0	●	C	
cyazofamid (0.5)	3.8	3.8	●●	●	●●●	0	0	●●●	C	2001
fluazinam (0.4)	2.9			●	●●●	0	0	●●●	C	1992
fluazinam + azoxystrobin (0.5)	3.6								C + C	2016
mandipropamid (0.6)	4.0		●●	●●	●●●	● <sup>6</sup>	●●	●●●	C/T	2005
mandipropamid + difenoconazole (0.6)	4.0		●●	●●	●●●	● <sup>6</sup>	●●	●●●	C/T + C	2005
benthiavalicarb (0.5)	4.2								T	2018
cymoxanil + metiram				●●	●●	●●	●	●●	T + C	1976
cymoxanil + copper				●●	●●	●●	●	●●	T + C	1976
dimethomorph + fluazinam (1.0)	3.7	3.3	●	●	●●●	●	●●	●●●	T + C	2012
(zoxamide + cymoxanil) + fluazinam (0.45+0.4)	4.0								C/T + C	2013
(zoxamide + dimethomorph) + fluazinam (1.0+0.4)	4.2								C/T + C	2015
mandipropamid + cymoxanil (0.6)	4.4		●●	●●	●●●	●●	●●	●●●	C/T + T	2013
(pyraclostrobin + dimethomorph) + adjuvant (2.5+1.0)	4.0 <sup>7</sup>								C/T + T	2012
metalaxyl-M + fluazinam <sup>2</sup>			●●	●●	●●●	●●●	●●●	●●●	S + C	
propamocarb + cymoxanil + cyazofamid ((2.0)+0.5)		4.6							S + T + C	2012
propamocarb + cymoxanil (2.0)					●●	●●● <sup>9</sup>	●●●		S + T	2011
propamocarb-HCl + fluopicolide (1.6)	3.8	3.9	●●	●●	●●●	●●	●●●	●●●	S + C/T	2006
oxathiapiprolin (0.15)			●●●	●●●	●●●	●●	●●●	●●●	S	2017
oxathiapiprolin + amisulbrom (0.15+0.3)	4.9								S + C	2018
oxathiapiprolin + amisulbrom (0.25)	4.9	3.9	●●●	●●●	●●●	●●	●●●	●●●	S + C	2022
oxathiapiprolin + benthiavalicarb (0.4)	4.9	3.4	●●●	●●●	●●●	●●	●●●	●●●	S + T	2019

<sup>1</sup> Includes maneb, mancozeb, propineb and metiram. <sup>2</sup> See proceedings for comments on phenylamide resistance. <sup>3</sup> Based on EuroBlight field test in 2006-2015. <sup>4</sup> Based on EuroBlight field trials 2009-2012. <sup>5</sup> Based on limited data. <sup>6</sup> In some trials there were indications that the rating was 1½. <sup>7</sup> A provisional rating based on 5 EuroBlight experiments. <sup>8</sup> Observations from several trials indicated that both New growth and Stem blight were ++. <sup>9</sup> In some trials the curative activity was +++.

# *P. infestans*



# Leaf blight update



<https://agro.au.dk/forskning/internationale-platforme/euroblight/control-strategies/late-blight-fungicide-table/>

Product (Dose rate [litre or kg/ha])	Leaf blight
copper	
dithiocarbamates (2.0) <sup>1</sup>	2.0
chlorothalonil	
cyazofamid (0.5)	3.8
fluazinam (0.4)	2.9
zoxamide + mancozeb (1.8)	2.8
amisulbrom + mancozeb (0.5+2.0)	4.5
ametotradin + mancozeb (2.5)	3.7
fluazinam + azoxystrobin (0.5)	3.6
famoxadone + cymoxanil	
(zoxamide + mancozeb) + cymoxanil (1.8+0.2)	3.4
mandipropamid (0.6)	4.0
mandipropamid + difenoconazole (0.6)	4.0
benthiavalcarb (0.5)	4.2
benthiavalcarb + mancozeb (2.0)	3.7
cymoxanil + metiram	
cymoxanil + copper	
cymoxanil + mancozeb	
dimethomorph + mancozeb (2.4)	3.0
dimethomorph + fluazinam (1.0)	3.7
fenamidone + mancozeb (1.5)	2.6
(zoxamide + cymoxanil) + fluazinam (0.45+0.4)	4.0
(zoxamide + dimethomorph) + fluazinam (1.0+0.4)	4.2
mandipropamid + cymoxanil (0.6)	4.4
(pyraclostrobin + dimethomorph) + adjuvant (2.5+1.0)	4.0 <sup>7</sup>
benalaxyl-M + mancozeb <sup>2</sup>	3.0
metalaxyl-M + mancozeb <sup>2</sup>	
metalaxyl-M + fluazinam <sup>2</sup>	
propamocarb + cymoxanil + cyazofamid ((2.0)+0.5)	
propamocarb + cymoxanil (2.0)	
propamocarb-HCl + fenamidone (2.0)	2.5
propamocarb-HCl + fluopicolide (1.6)	3.8
oxathiapiprolin (0.15)	
oxathiapiprolin + famoxadone (0.5)	4.9
oxathiapiprolin + amisulbrom (0.15+0.3)	4.9



# Foliar blight



- The reference is mancozeb rating 2.0
- UTC is not a suitable reference
- We have looked at other products which already have been tested in the trials, but we encountered scaling problems
- It was decided not to include a potential new reference!
- In 2022 & 2023 3 FB experiments were carried out with mancozeb as a reference
- No new addition to the table

# Tuber blight

- The reference is mancozeb rating 0.0
- UTC is not a suitable reference
- We have looked at other products which already have been tested in the trials, not stable
- It was decided not to include a potential new reference!
- In 2022 & 2023 3 TB experiments were carried out with mancozeb as a reference
- No new addition to the table



# *P. infestans* population dynamic



Continent  
 Europe

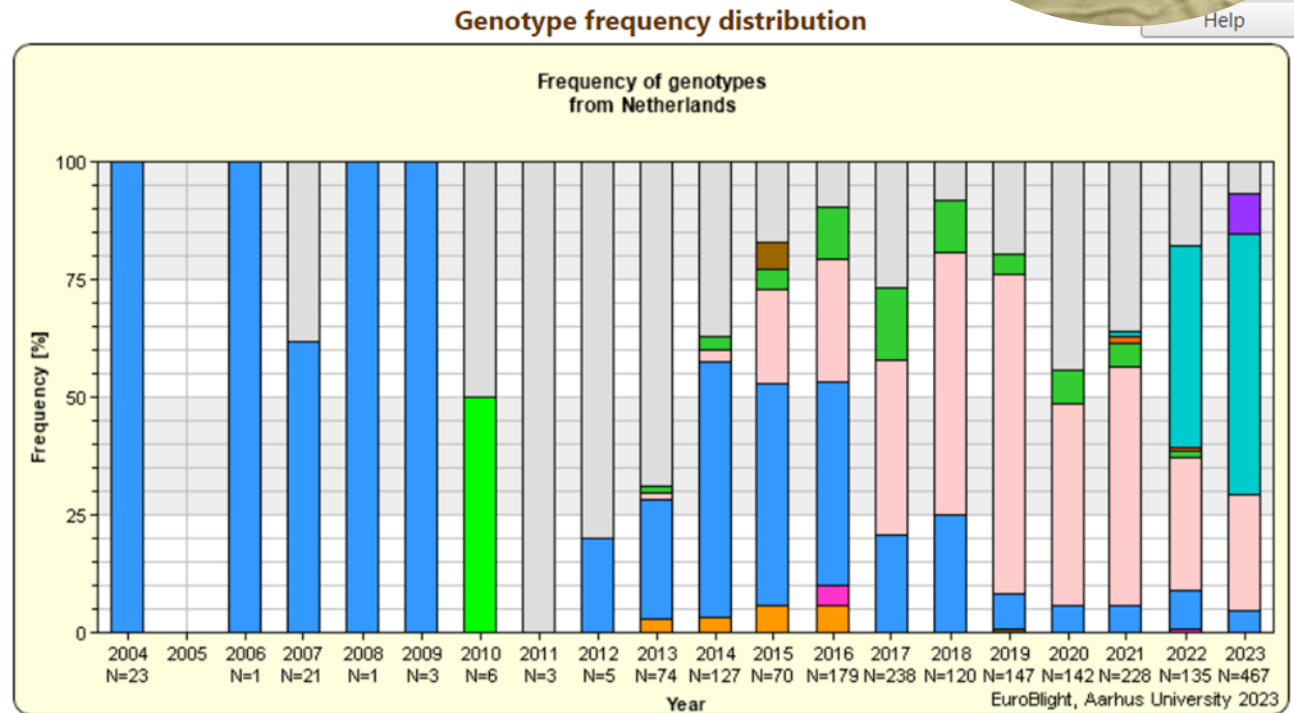
Country  
 Netherlands

Host  
 All  
 N/A  Other  Potato  Tomato

Show

Genotype legend ?

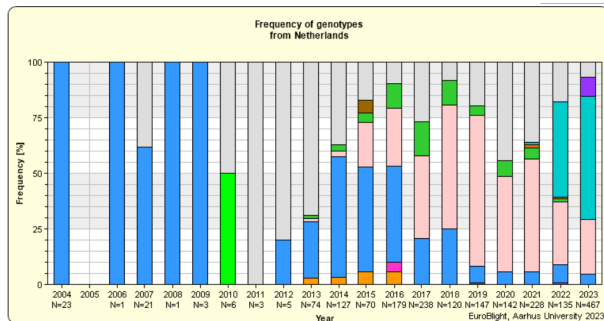
<span style="color: orange;">■</span> EU_1_A1	<span style="color: magenta;">■</span> EU_6_A1
<span style="color: brown;">■</span> EU_12_A1	<span style="color: blue;">■</span> EU_13_A2
<span style="color: green;">■</span> EU_33_A2	<span style="color: pink;">■</span> EU_36_A2
<span style="color: limegreen;">■</span> EU_37_A2	<span style="color: brown;">■</span> EU_39_A1
<span style="color: orange;">■</span> EU_41_A2	<span style="color: cyan;">■</span> EU_43_A1
<span style="color: purple;">■</span> EU_46_A1	<span style="color: gray;">■</span> Other



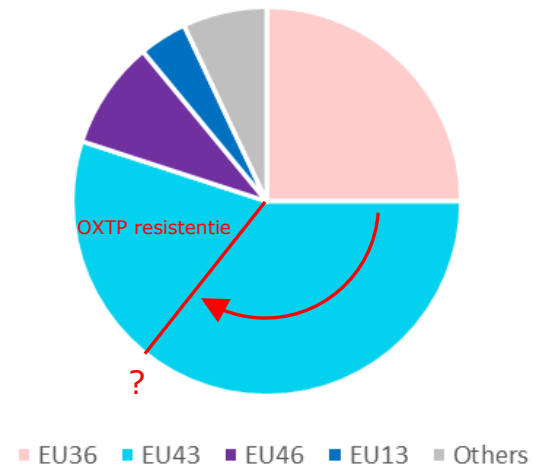


# *P. infestans* population NL after 2023

N = 467		Populatie aandeel klonale lijnen
EU36	25	
EU43	55	
EU46	9	
EU13	4	
Others	7	



*P. infestans* genotypes NL 2023  
N = 467



# Fungicide resistance & table

- <sup>2</sup> See proceedings for comments on phenylamide resistance.
- I thought there was also a comment on fluazinam resistance
- Propose to also add a comment on CAA and OBSPI resistance
- *P. infestans* isolates that are less sensitive to active ingredients have been isolated from potato plants in Europe. Therefore, resistance management strategies should be implemented (see FRAC web site for details). Ratings will be lower where fungicide insensitive strains are present.

# Fungicide resistance & table

- In case fungicide resistance is found for a product (active ingredient) we propose to skip that trial for calculation of the rating
- A footnote should be included that resistance was found
  - See previous slide
- In such a case an extra trial is necessary for calculating a rating

# Alternaria

One new additionv



# Table based on experiments

Plant Protection Product	Efficacy rating <sup>1,2</sup>	
	14 day interval	7 day interval
<b><i>Products specific for early blight control</i></b>		
Spray interval 14 days		
(fluopyram + prothioconazole) 0.5	4.5	
(difenoconazole + mandipropamid) 0.6	3.3	
difenoconazole 0.5	3.3	3.9
<b><i>Products with side efficacy against early blight<sup>3</sup></i></b>		
Spray interval 7 days		
mancozeb 2.0	2.3	3.2
(zoxamide + mancozeb) 1.8		3.5
(fenamidone <sup>3</sup> + propamocarb) 2.0		3.0
(fluazinam + azoxystrobin <sup>3</sup> ) 0.5		3.6
(dimethomorph + mancozeb) 2.0		3.5

<https://agro.au.dk/forskning/internationale-platforme/euroblight/alternaria/early-blight-fungicide-table/early-blight-fungicide-table/>



# Early blight EuroBlight table

## Products specific for early blight control

Product (Dose rate [litre or kg/ha])	Efficacy rating <sup>1,2</sup> 14 day interval	Efficacy rating <sup>1,2</sup> 7 day interval	
fluopyram + prothioconazole (0.5)	4.5		
mefentrifluconazole (1.25)	4.3		
difenoconazole + mandipropamid (0.6)	3.3		
difenoconazole (0.5)	3.3	3.9	

## Products with side efficacy against early blight<sup>3</sup>

Product (Dose rate [litre or kg/ha])	Efficacy rating <sup>1,2</sup> 14 day interval	Efficacy rating <sup>1,2</sup> 7 day interval	
mancozeb (2.0)	2.3	3.2	
zoxamide + mancozeb (1.8)		3.5	
fenamidone + propamocarb (2.0)		3.0	
fluazinam + azoxystrobin (0.5)		3.6	
dimethomorph + mancozeb (2.0)		3.5	

<sup>1</sup>: Ratings for early blight control are based on results from EuroBlight field trials during 2015-2021, and only compounds included in these trials are rated for *Alternaria*. The scale for *Alternaria* is a 0-5 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>: *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 FRAC web site for details). Rating will be lower where fungicide insensitive strains are present.

<https://agro.au.dk/forskning/internationale-platforme/euroblight/alternaria/early-blight-fungicide-table/early-blight-fungicide-table>

# Characteristics

- Reference: the untreated control rated 0
- Voluntary reference: mancozeb
- NEW: last assessment 3-4 weeks after last application
- A successful trial need  $>10\%$  foliar infection in the worst treatment
  - 1 trial not valid
- Inoculation permitted with kernels
- Misting permitted
- Control strategies removed from the table
- No trials in 2024

# Organic or BioBlight





# Characteristics organic or BioBlight

- Reference: untreated control rated 0 of maximum 5
- First experiments in 2019-2023 NL
- No table yet
  - What would a table look like?
- UTC allotted to the trial
- First idea was to look at the ability of the biocontrol agents to postpone the onset of the PLB epidemic rather than the StAUDPC
  - However, this proved to be difficult therefore StAUDPC is probably better

# Characteristics organic or BioBlight

- Choose a more robust cultivar, but not resistant
- No artificial inoculation but natural influx
- Sprinklers and spreader rows optional
- 2019-2020 weekly spray
  - Major disadvantage concerning m.o.a.
  - Not targeted at infection risks
- Propose: spray based on infection risk & m.o.a. to ensure the best possible result
- NL in 2021 high disease pressure meant about a weekly spray
- Until now no coordinated experiments in various countries

# In 2021 start workgroup on Bio(Euro)Blight ?

- How to lay-out trials
- Mode of actions
- Timing / DSS
- Number of applications
- Growth stage
- How to interpret the results?
- How to publish the results for farmers and advisors to use?

# Control

## In the future



# Future

- What is the effect of significantly changing Pi populations on the efficacy of the fungicides to control potato late blight?
  - Fixed ratings
- Is it harder now to get a good rating than in the past?
  - Should be (partly) accounted for by the reference mancozeb
- We have already been discussing the life span of the ratings, can we come to an advice for an updated protocol?

# Discussion

Thank you for your  
attention

[Bert.Evenhuis@wur.nl](mailto:Bert.Evenhuis@wur.nl)

