Diagnosing leaf spots

The role of *Alternaria solani, A. alternata* & ozone

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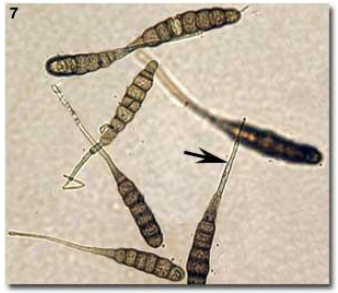
Leaf spots in potato: 2009-2014

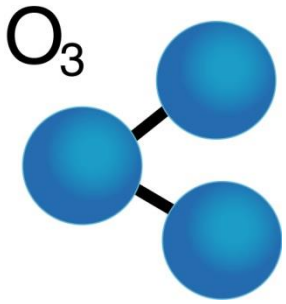
- Sampling of leaves with spots; >10.000 spots analyzed in the lab over the last years
- Various nutrient deficiencies & crop protection damages were observed
- Most spots caused by **fungal pathogens** and **ozone**

Players involved in this presentation:

Alternaria alternata



A. solani



Ozone

The role of *Alternaria alternata*

- Found in many lesions of all shapes and sizes
- Very frequently occurring fungus (allergy warnings!)
- If present so often, how come not everything is dying?
- Also often *not* found in lesions
- Questions on the pathogenic capacities of *A. alternata*

The role of *Alternaria alternata*

A. solani ***A. alternata*** **Control**

Reported for many cultivars

Both in detached leaf assays & field trials

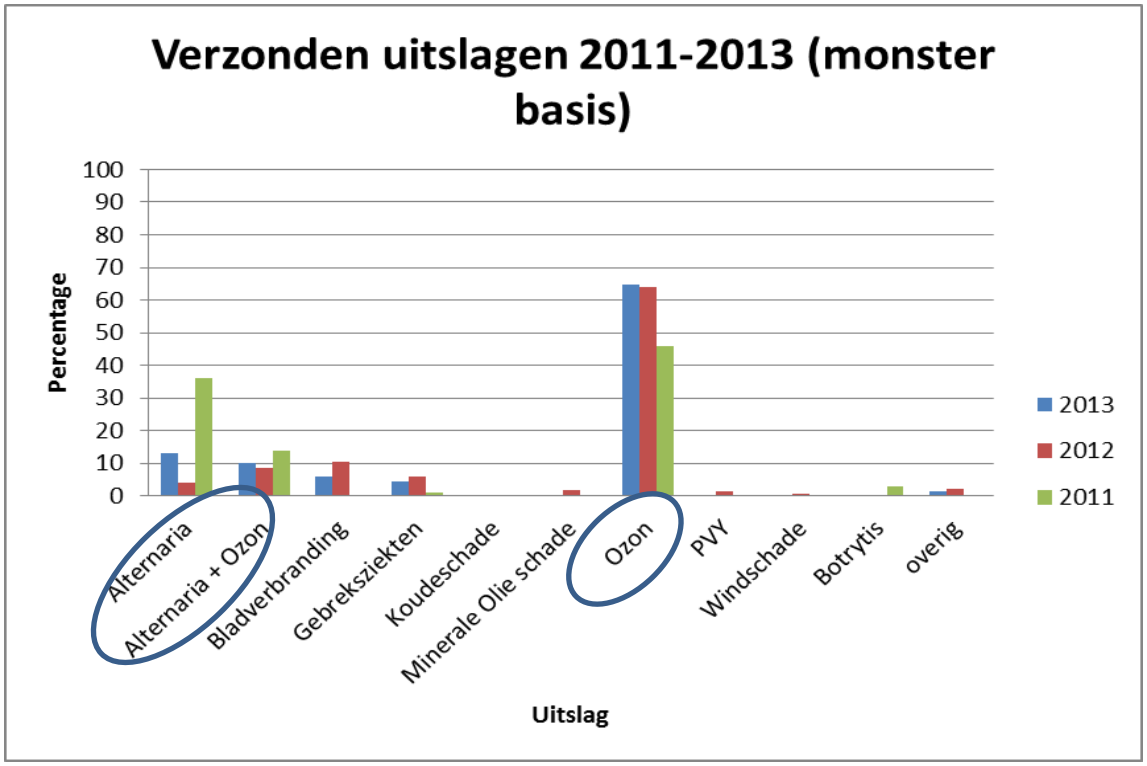
Statistically shown not likely to be a pathogen

-> Detailed presentations from Euroblight available on the role of *A. alternata*

The role of *Alternaria alternata*

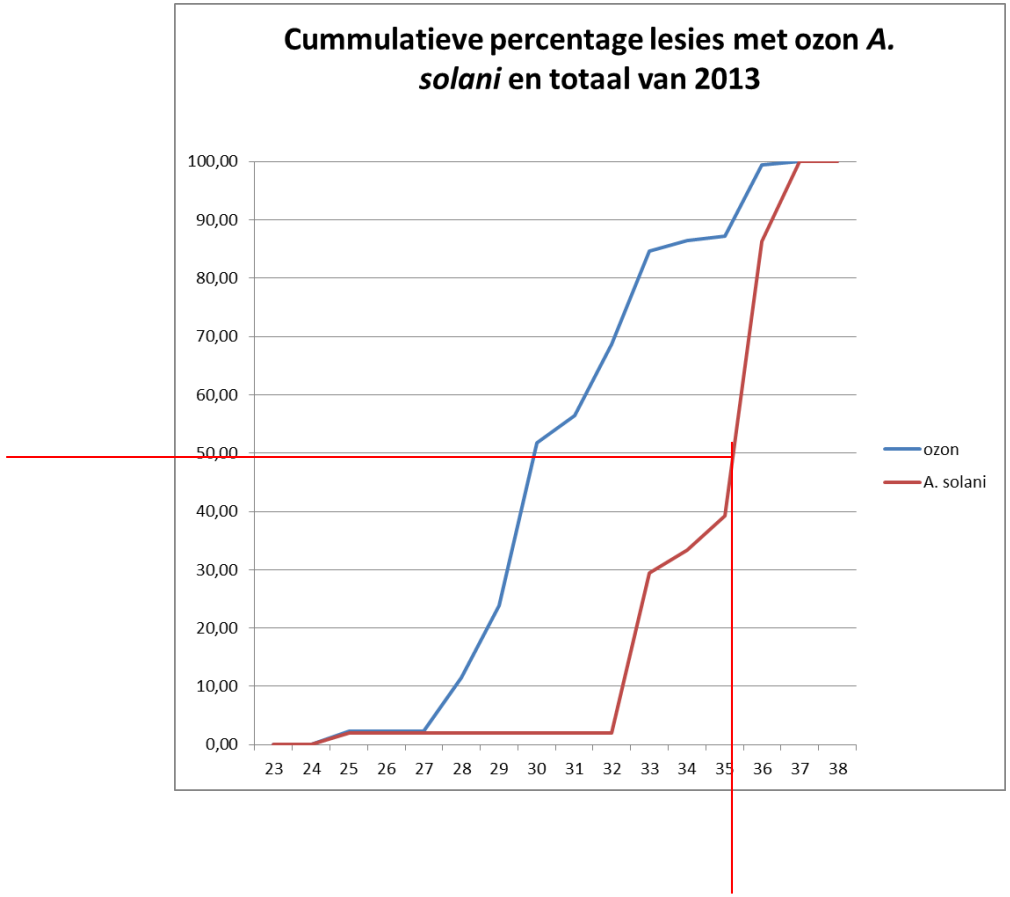
A. solani ***A. alternata*** **Control**

Focus in this presentation



Ozone & *Alternaria solani* account for almost all the leaf spots, with ozone being the cause of 60-80% of lesions

A. solani and ozone; 2013



How to read: 50% of all the ozone lesions in 2013 was found before week 29. On the other hand, 50% of all early blight lesions was found before week 35.
In other words: ozone appears early in the season, early blight is late (later than late blight, usually. True again in 2014!)

Ozone: the unseen problem

- Ozone: O_3, radical molecule; very reactive
- Responsible for destruction of cell tissue
- Peak concentrations going down, but average concentrations rising. Influenced by air pollution, agriculture, temperature, sunlight and humidity
- Plants have a natural anti-radical (anti-oxidant) system in place, but this only gets them so far...

Europees graan lijdt onder luchtvervuiling VS

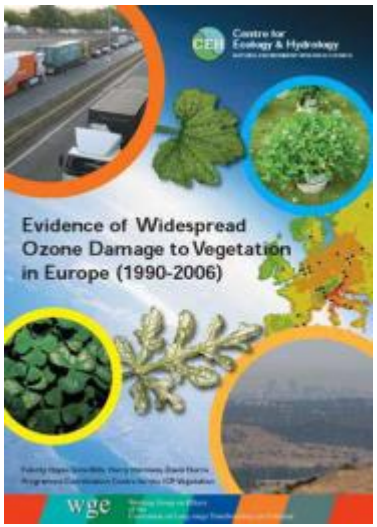
Geplaatst op maandag 06-02-2012

Luchtvervuiling in Noord-Amerika heeft directe gevolgen voor de oogsten in andere delen van de wereld. Onderzoek van de Universiteit van Leeds toont aan dat door ozonvervuiling in de VS de tarweproductie in Europa met 1,2 miljoen ton is verminderd.

Ozone damage

- Plenty of knowledge about ozone and crop damage
- Yet, at least in NL, it is not a problem, because we chose to ignore it
- No good measures possible (how does one prevent ozone?)
- No good measurements possible (how does one measure a leaf spot actually has been caused by ozone?)

A good read on the subject →



Ozone trials 2013 & 2014

- Goals of trial:

1) Demonstrate the damaging abilities of ozone to farmers, companies, advisors etc.

2) Find differences in cultivar resistance to ozone

3) Find influences of nutrients on resistance to ozone

4) Find possible application of crop protection agents to defend against ozone

Ozone 2013

- Professionally scored:

Ozone 2013/2014: Cultivars

Markies

Innovator

Miranda

Other cultivars tested in 2014: results currently in analysis; but big differences visible

Ozone 2014: nutrients & protectants

Preliminary results:

- Effect of nitrogen obvious, magnesium not as much

- Some protectants appear to provide some degree of defense against ozone

Thank you

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