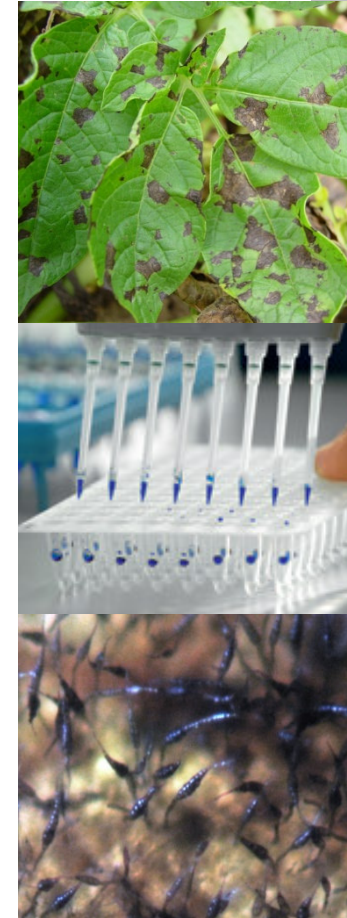


# Sensitivity of German *Alternaria solani* isolates against QoI fungicides

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Euroblight Workshop, St. Petersburg, Russia  
9-12. Oct. 2011



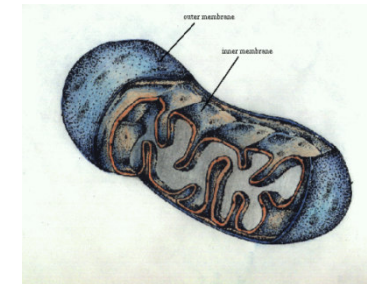
## HISTORY:

- AZ registered in potatoes in US since 1999
- Typical fungicide program for EB uses 8 to 10 fungicide applications per season
- Field samples revealed reduced sensitivity to QoI fungicides (AZ) since 2001
- F129L mutation in *A. solani* appears to reduce disease control of AZ by ~ 50%



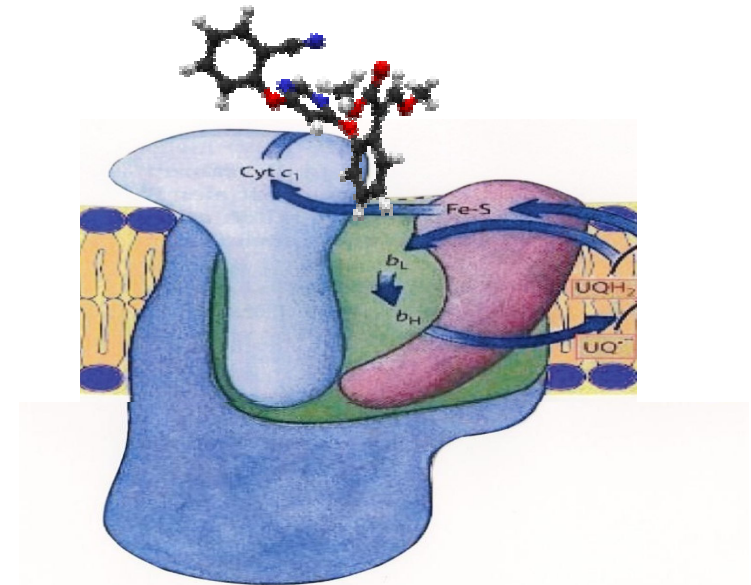
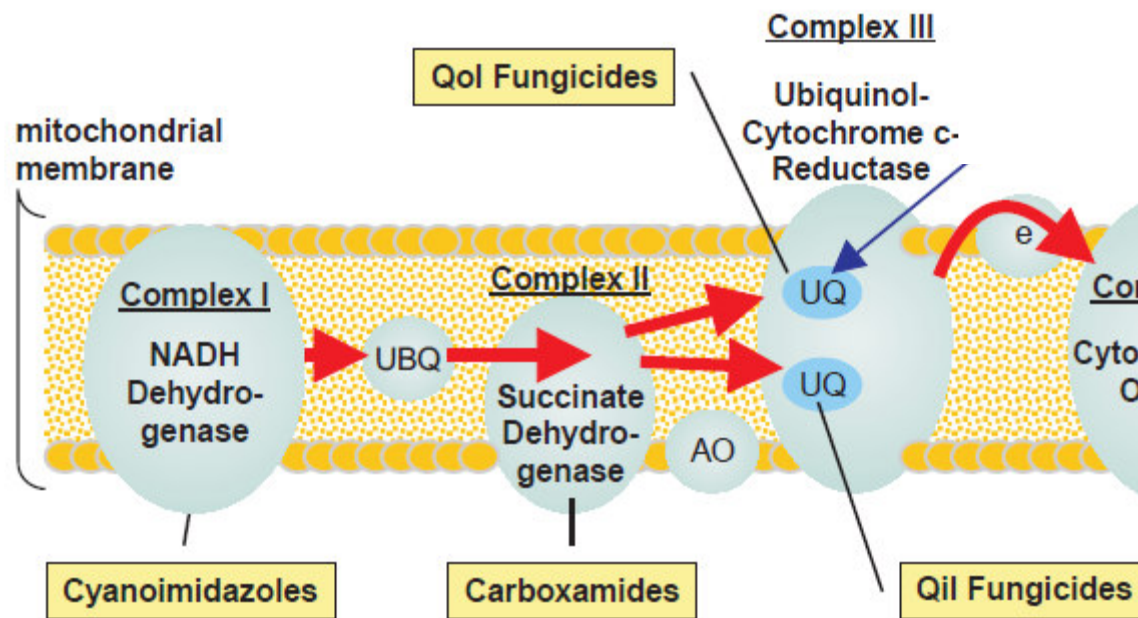
## Azoxystrobin – a single-site inhibitor:

- Site-specific inhibitor, which targets individual site within the fungal cell
- Azoxystrobin inhibits mitochondrial respiration, blocking the cytochrome  $bc_1$  complex
- Active at only one critical point, enzyme, or protein in the metabolic pathways of a fungus



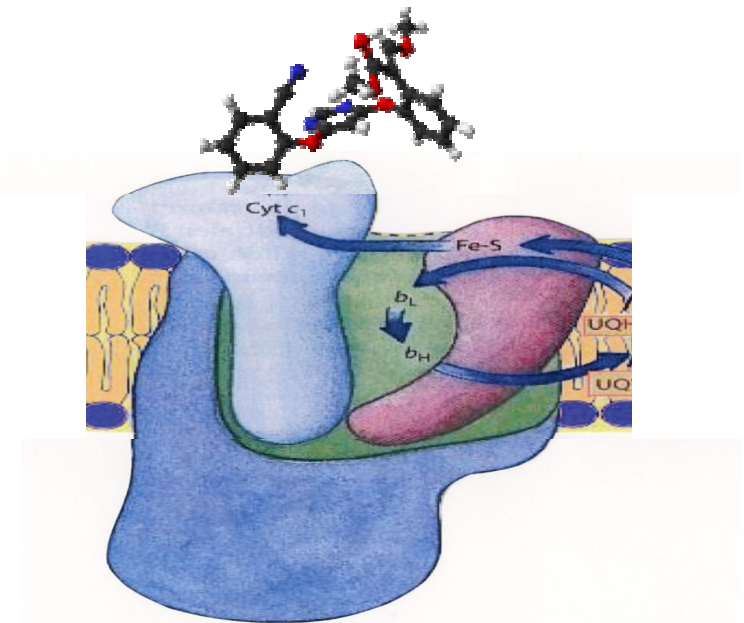
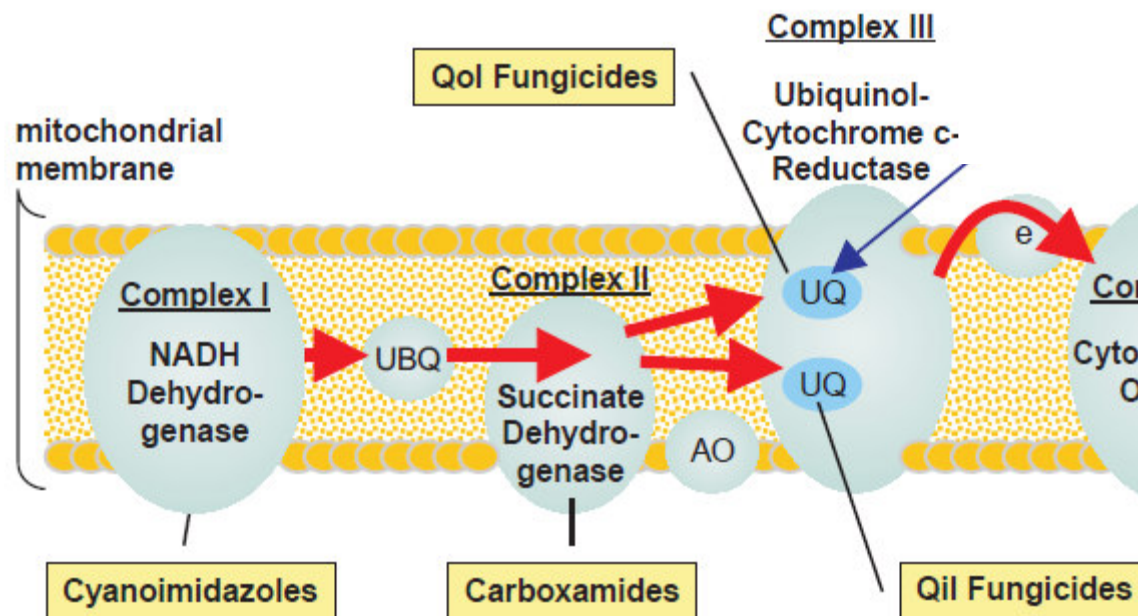
### Problem:

- One mutation at the target site can result in a fungicide-resistant fungal strain.
- Cross resistance among all strobilurins



Reference: Kuck and Mehl, Pflanzenschutz-Nachrichten 56/2003,

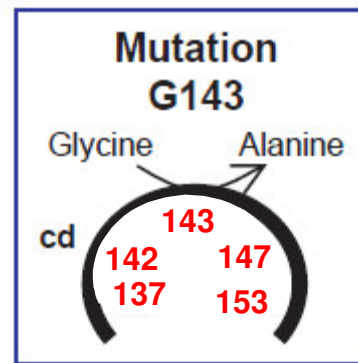




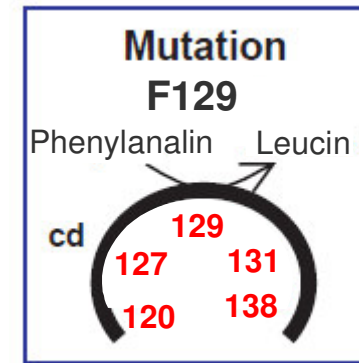
Reference: Kuck and Mehl, Pflanzenschutz-Nachrichten 56/2003,



## G 143 A



## F 129 L



example: *Septoria tritici*,  
*Blumeria graminis*

mutation: complete resistance

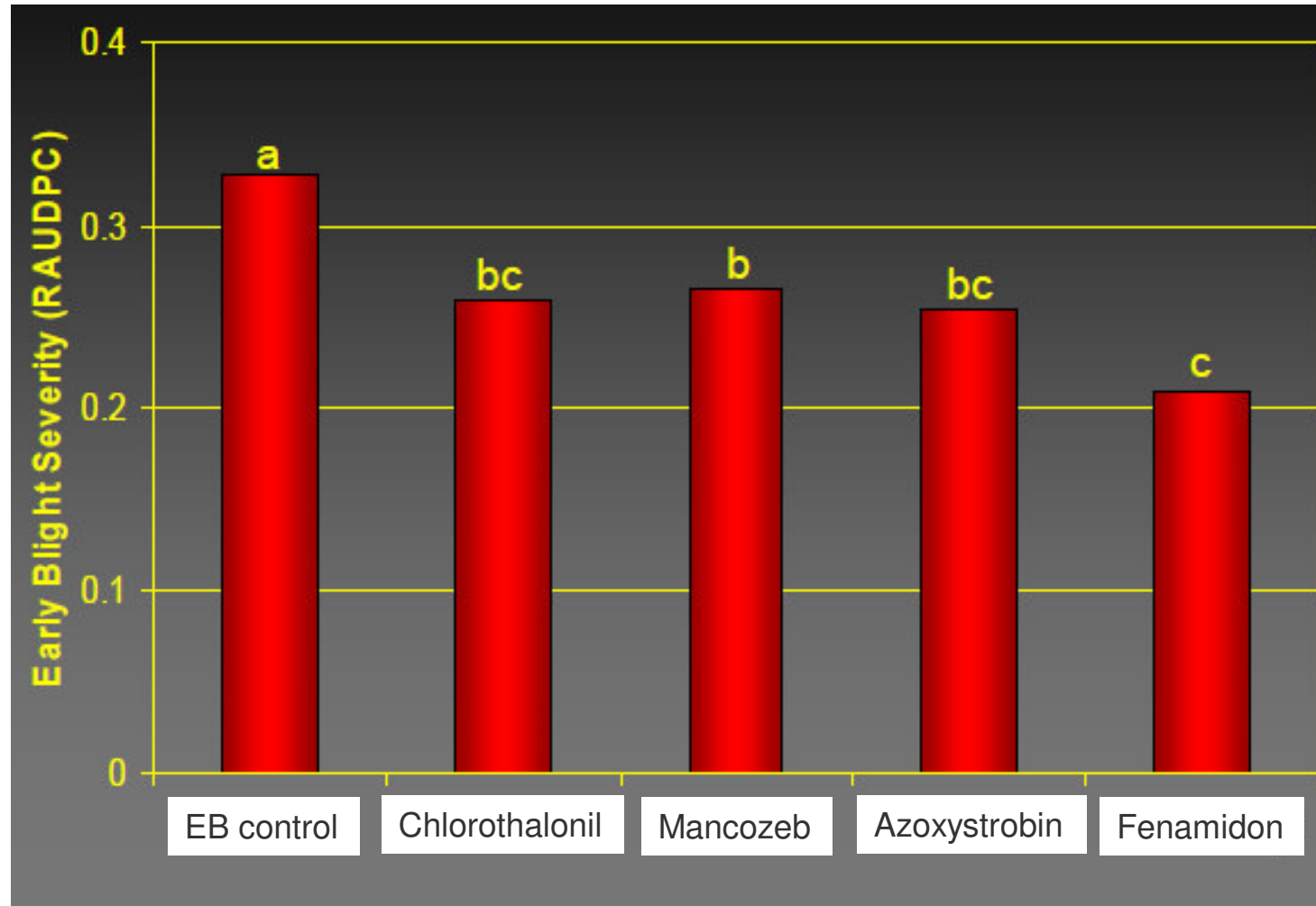
effect: complete loss of sensitivity

*Drechslera tritici repentis*,  
*Alternaria solani*

partial resistance

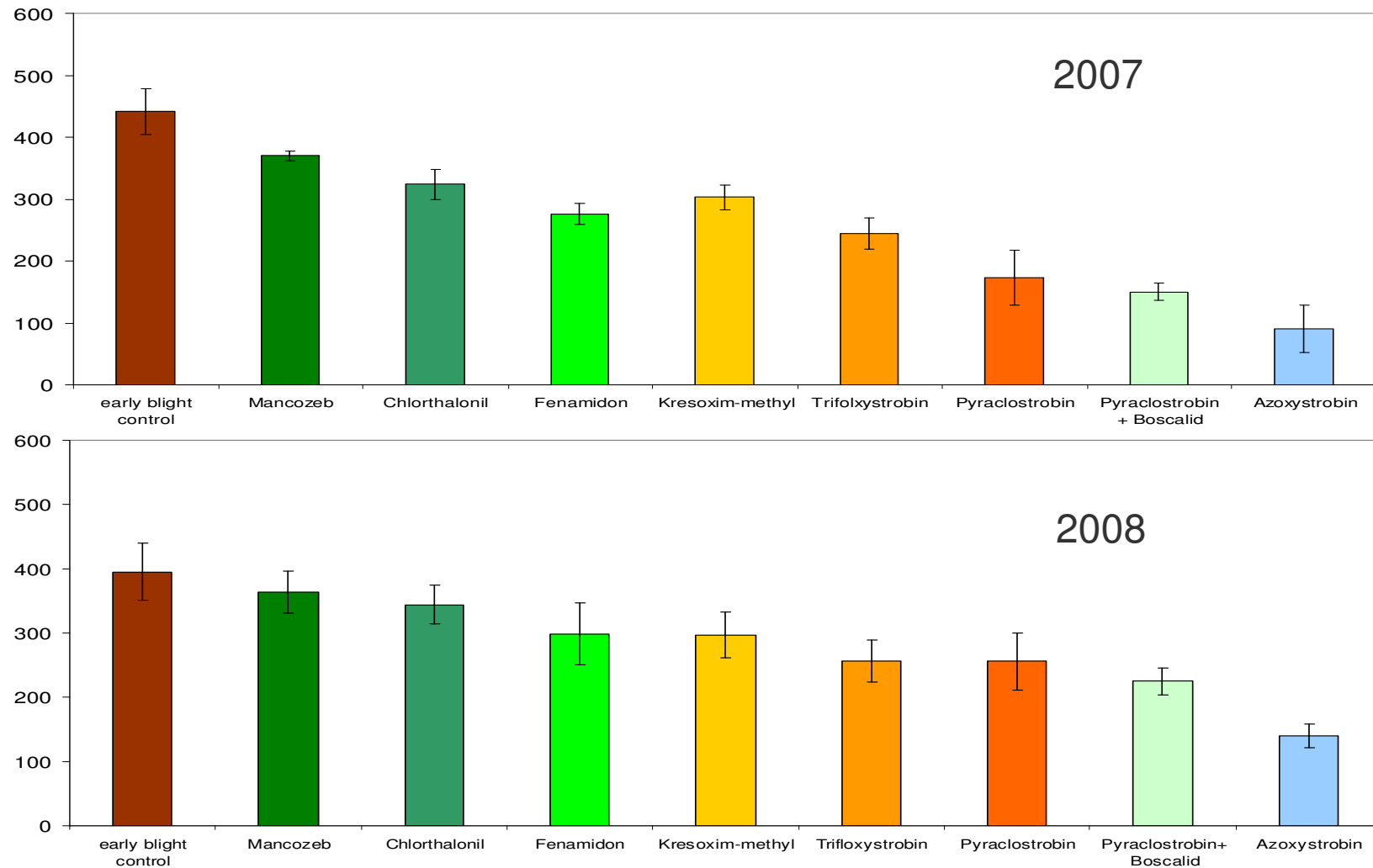
reduced sensitivity

# EB severity in Central MN, 2005



# Fungicide-specific development of EB disease (AUDPC)

AUDPC (day & %)

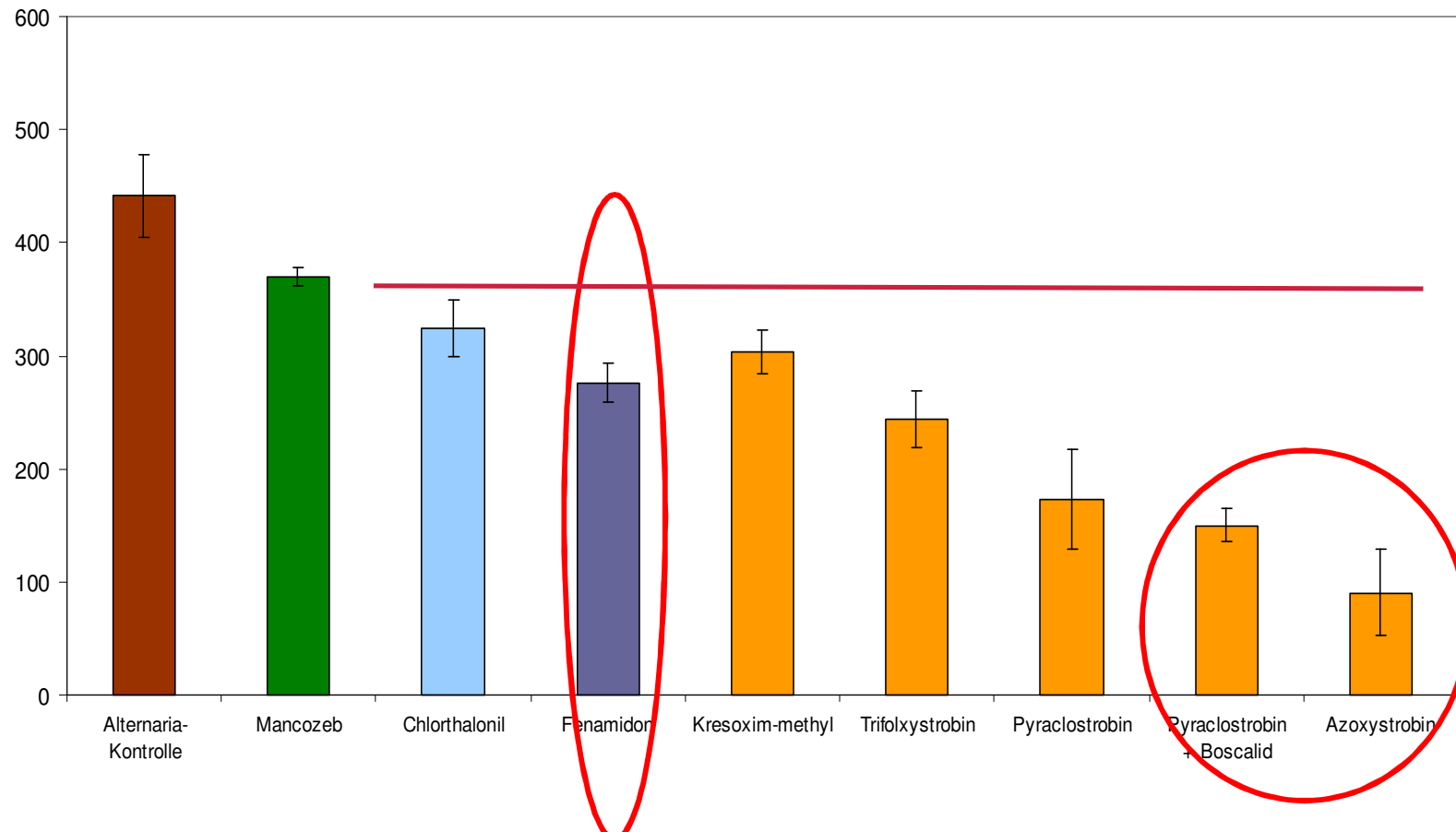


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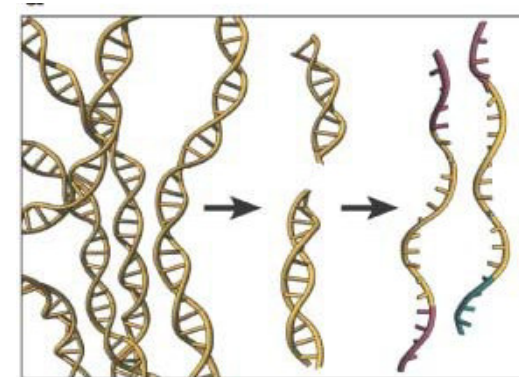
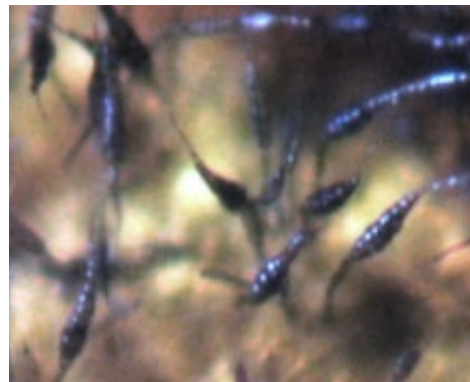
AUDPC (day & %)



High efficacy of Azoxystrobin and Pyraclostrobin+Boscalid confirmed in 2010 and 2011



- isolate sampling beginning in 2005 (before introduction of AZ) until now
- isolates from EB untreated and treated fields, located within Germany
- assess presence of F129L mutations in the cytochrome bc1 gene
- sequencing of CytB gene of *A. solani* isolates
- development of a specific primer set (214 bp fragment)



## What does resistance mean for future management of EB?

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1. F129L mutation present within German *A. solani* populations
2. However, up to now no noticeable loss of sensitivity in field

Future EB management:

- fungicide treatment based on knowledge of disease development (threshold values), do not apply fungicides during disease epidemic
- limit sprays with QoI fungicides to 3 applications
- do not reduce fungicide rates
- use multiple chemistries (modes of action) in season-long control programs
- good disease management in order to reduce the inoculum density
- further good agricultural practices will be needed (varieties, crop rotation, catch crops)
- mutation occurs naturally, monitor for reduced sensitivity



1. collection of *A. solani* isolates and investigation of the occurrence of F129L mutation
  - sensitivity tests (wildtype and F129L mutants) with QoI fungicides
  - in vitro assessment of QoI sensitivity (determination of EC50%)



Thanks for your attention !

