

Alternaria solani

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occurrence and fungicide sensitivity in Sweden

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Outline

- Background
- Inventory of causal agent(s)
- Strobilurins – useful or not?

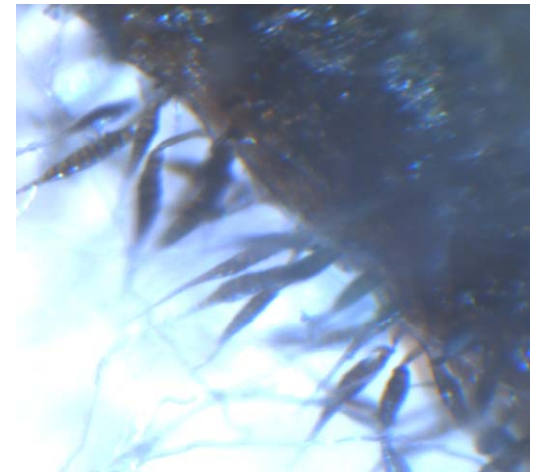


Background

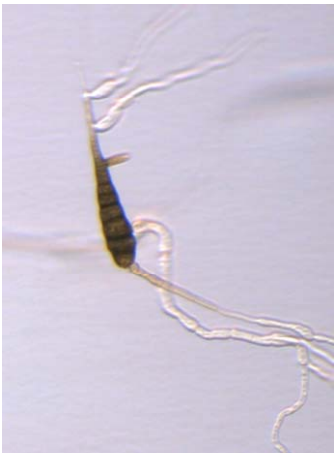
- Total harvest 860,000 tonnes
 - Ware potato 560,000 tonnes (19,000 ha)
 - Starch potato 7,300 ha
- Severe outbreaks in Southeastern Sweden
- Old and damaged leaves more susceptible
- Reduced yield up to 20% (starch content decreases)



Biology



- Good ability to sporulate
 - Conidiophores/conidia develop during shifting warm and damp weather
 - Windborne or splash water droplets
- Free water + high air humidity at germination
- Harvest residues
- Infected volunteers plant or weed hosts



Prevention

- A thriving, unstressed plant is less susceptible
 - Nitrogen & Water
- Late varieties
- Let the tubers mature – better peel



Treatments

- Strobilurin treatment
 - 1-2 Amistar (azoxystrobin)
 - 2-4 Signum (pyraclostrobin + boscalid)
- Mancozeb fungicides have effect
 - Carcinogenic metabolites

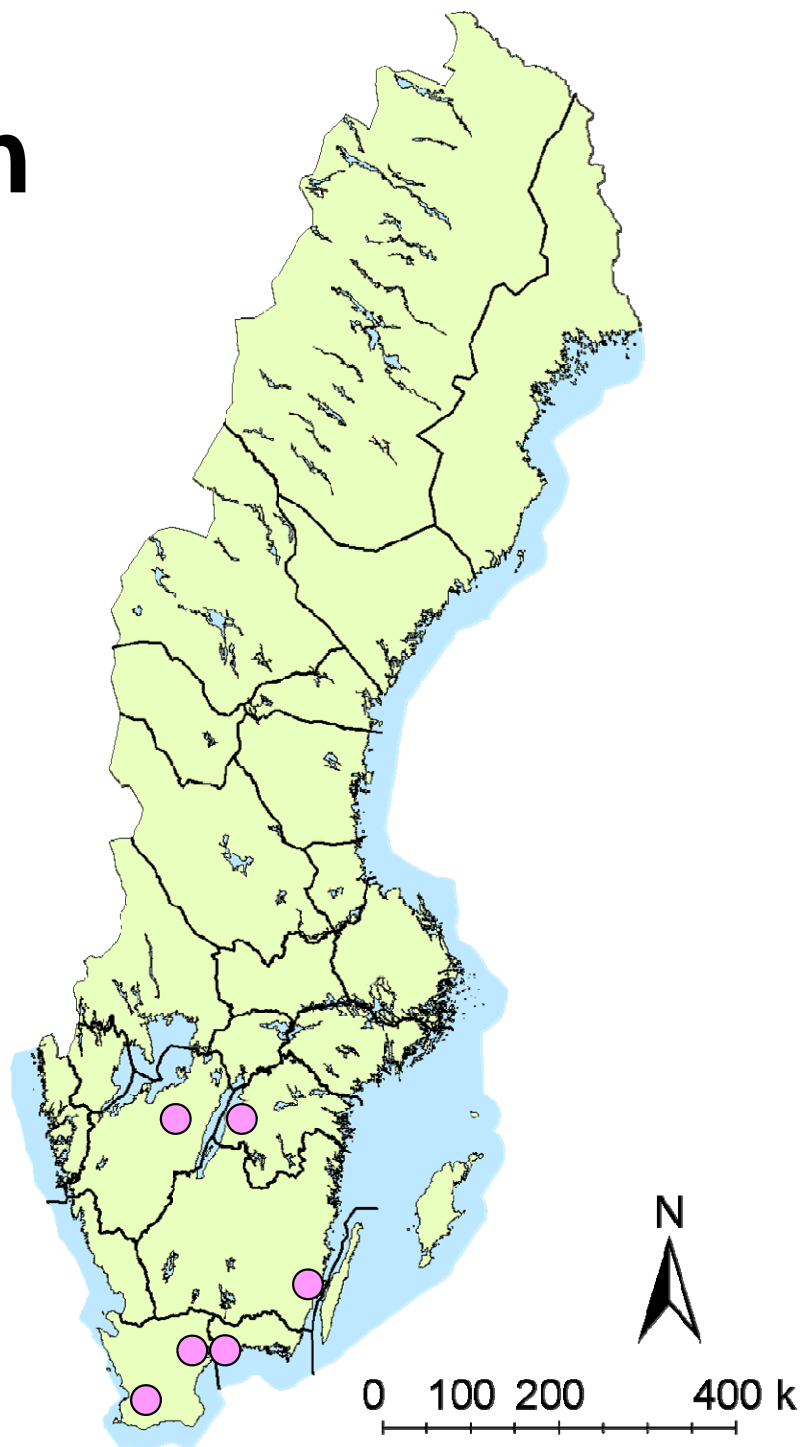


Inventory of the causal agent(s)

- Starch potato, 2009-2011
Skåne, Listerlandet &
Kalmar/Öland
- Ware potato, 2010-2011
Skåne, Öster- & Västergötland



Collection sites



Inventory of the causal agent(s)

- Collections of leaves with lesions or symptomless in early season.
 - 2009: 2-3 collections (Aug + Sep)
 - 2010: 5 collections (early - late season)
- Normally 1-2 strobilurin treatments



Disease progress, untreated crop



5th Aug 2009

Treated crops
in Sep 2009



28th Aug 2009

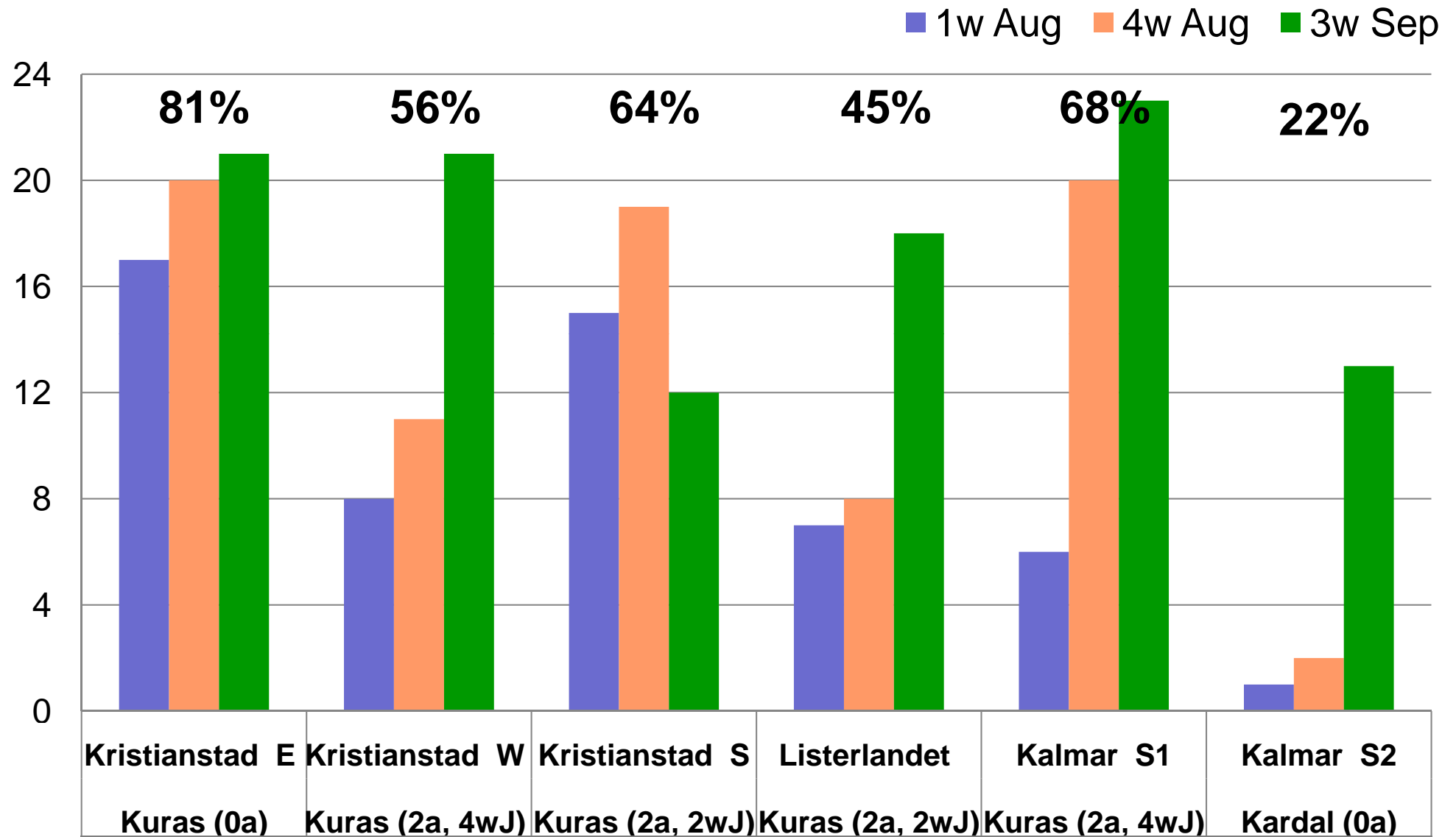


Lesion on leaf



22nd Sep 2009

Positive *A. solani* in 24 samples /collection



A. alternata identified in 1 sample (Kalmar S2, 2nd coll.)

Do strobilurins still work?

- Inhibits the energy synthesis (ATP)
 - Growth and spore germination
- The majority of the population of *A. solani* in USA has lost the sensitivity toward strobilurins
- How is the situation in the Swedish potato production?
 - Severe disease incidence despite 1-2 treatments with strobilurins



Substitutions that decreases the sensitivity toward strobilurins

- Substitution of amino acid at position 129, 137 or 143 i cytochrome *b*
- Substitutions are called F129L, G137R resp. G143A
- Three versions of F129L have been found in *A. solani* in USA



Identification of substitutions

- **Sequencing**

Wildtype: AGCT**TT**CCTG

Three subst. of F129L: AGCT**CT**CCTG

AGCT**TTA**CTG

AGCT**TTG**CTG

- **New F-primer for PCR-product that includes pos. 129, 137 & 143**

- 143 reverse primer (Rosenzweig *et al.*, 2008)



Results from sequencing

- **All of the Swedish isolates collected in 2009 were wild type**
- **To be continued...**



Summary of the early blight project

- Early blight caused by *A. solani* is wide spread in Southern Sweden
- Brown spot caused by *A. alternata* is rare
- Strobilurins are still effective
 - Exceptions may occur: timing & abiotic effects?

