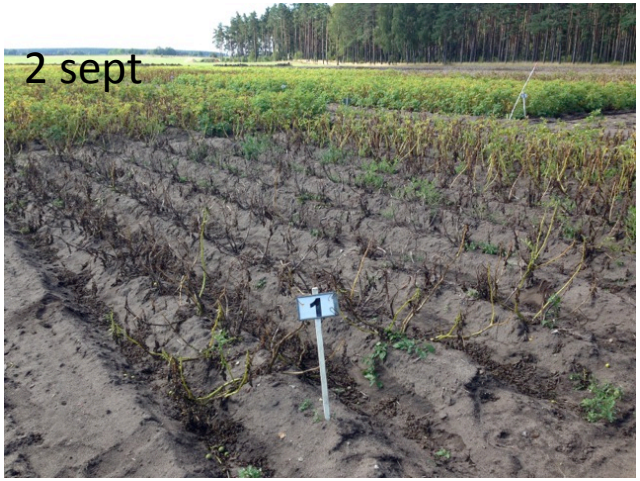
Early blight in Sweden

Erland Liljeroth, Firuz Odilbekov, SLU, Alnarp
Eva Edin, SLU, Ultuna

Field trials and analysis

- 2014 Two trials in Kristianstad (south)
  - Amistar vs. Revus Top + Signum
  - Cultivar (starch), dose and timing Revus Top + Signum
- 2015 One trial Kristianstad, one in central Sweden
  - Cultivar (food), Revus Top + Signum, silicate
  - Amistar vs. Signum (western Sweden)
- Overview F129L in Sweden, Norway, Finland
- Populations study 2014
- Sensitivity tests

Early blight
Nymö, Kristianstad, 2014

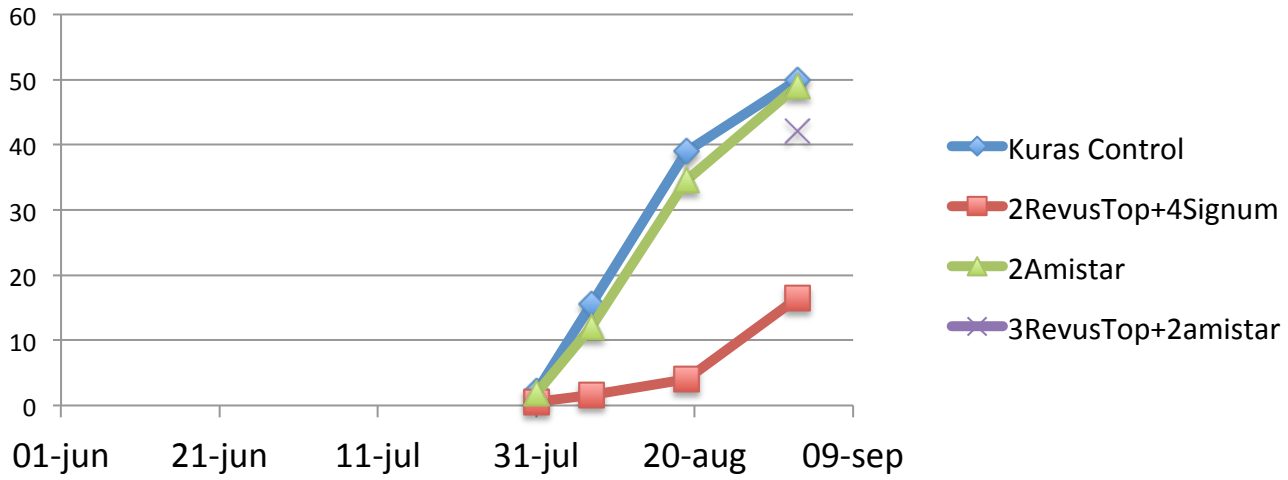


Starch potato

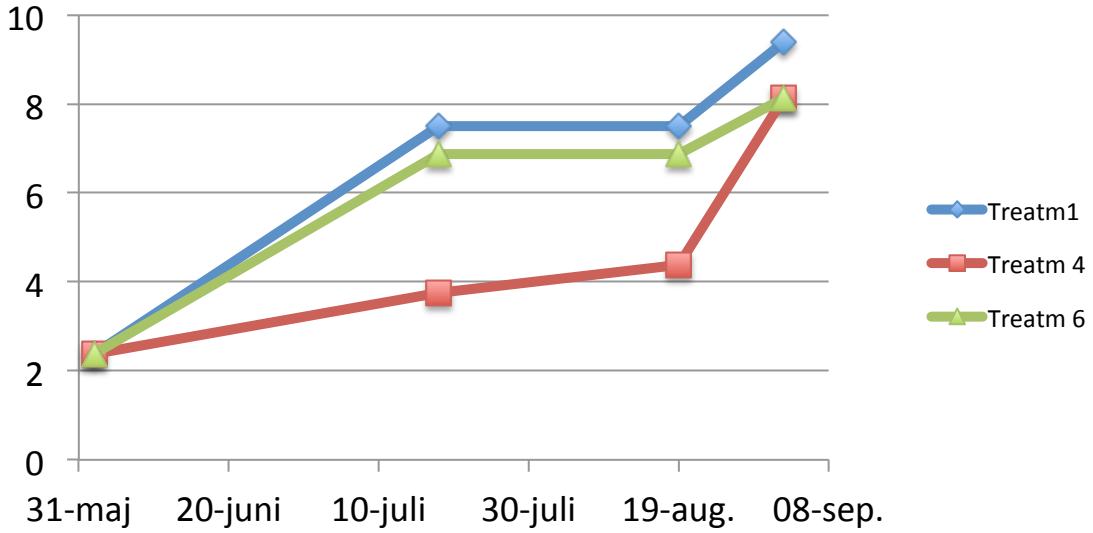
Early and severe infections

Trial 1 2014, Effect of fungicides in field

Infektion (% green leaf area with necrotic spots)



No of *A. solani* isolates per 10 leaves, Nymö 2014



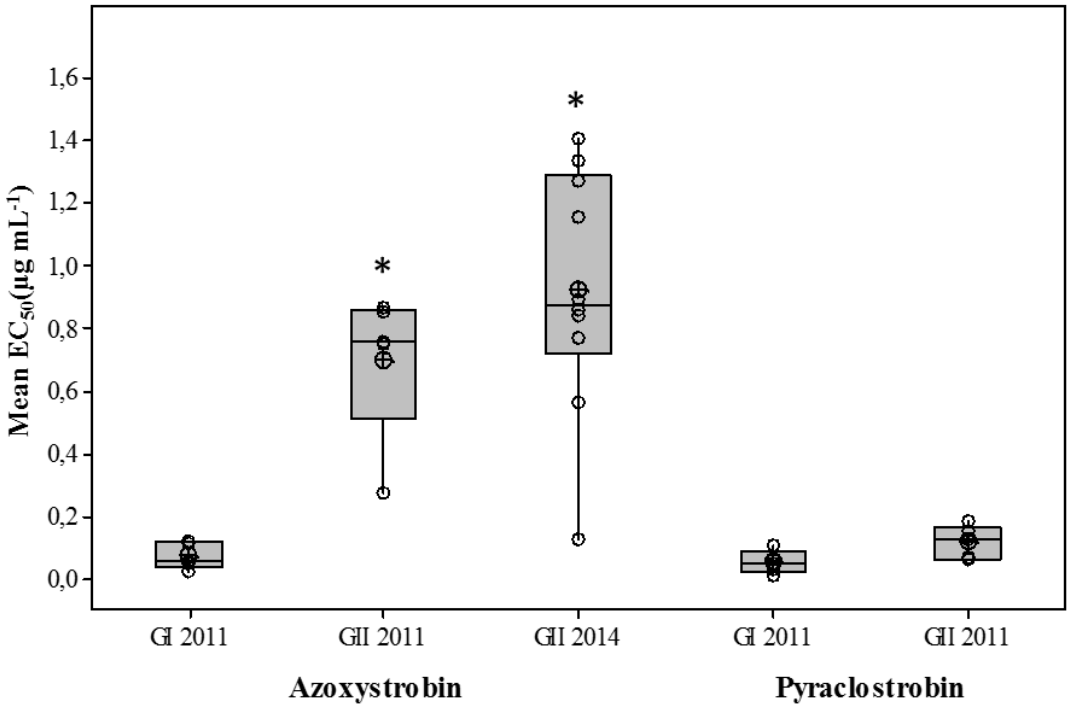
Amistar : 7/7 och 21/7

Revus Top: 16/6 och 21/6

Signum: 30/6, 15/7, 28/7 och 11/8

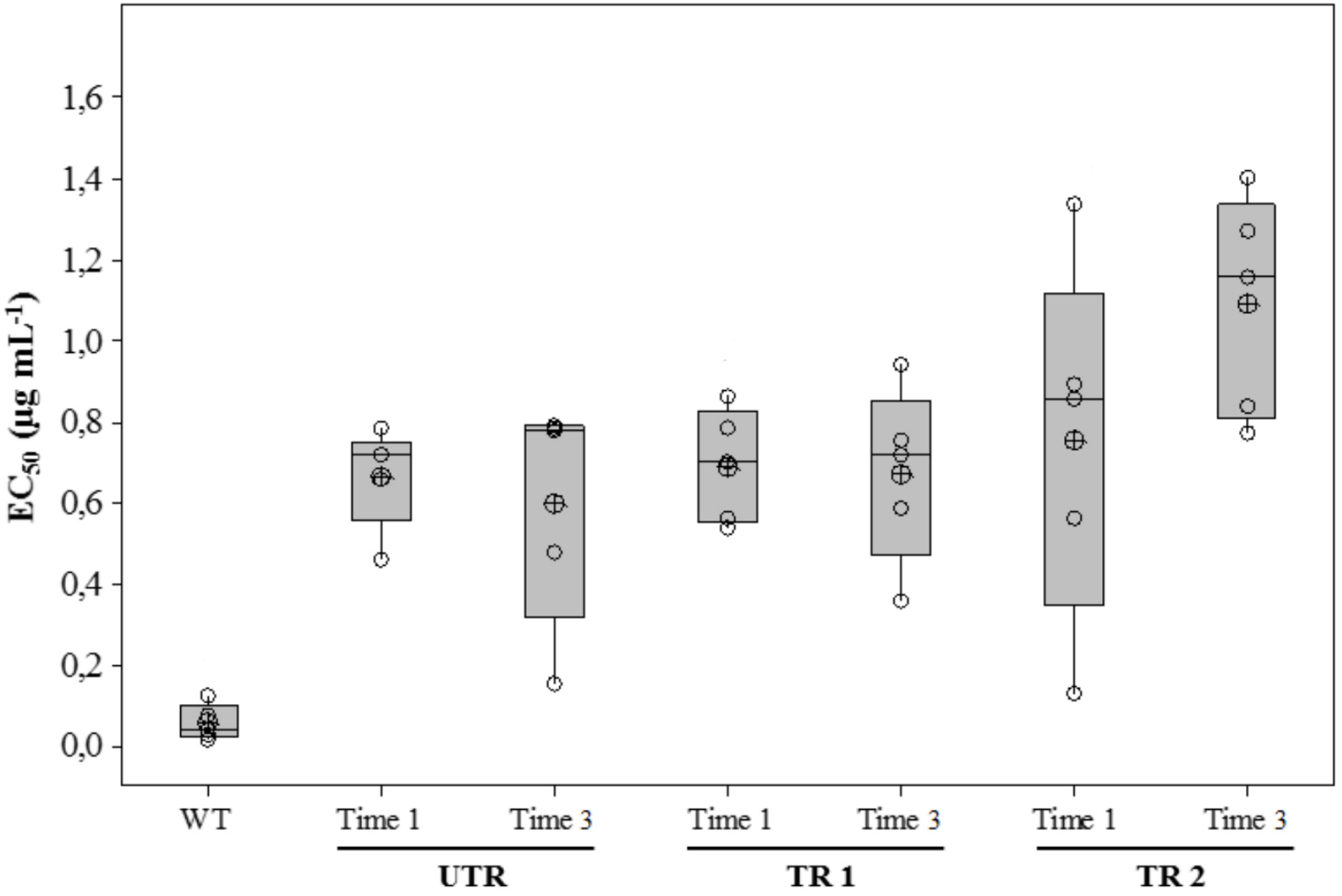
- Out of 143 isolates analyzed from Kristianstad field 2014 all except 2 were GII F129L
- Reduced sensitivity to azoxystrobin

- Tendency to lower sensitivity compared to isolates from same farm 2011



Firuz Odilbekov, SLU, Alnarp

Within season change in sensitivity?
Effect of treatment (wt excluded) almost significant (p=0.053)

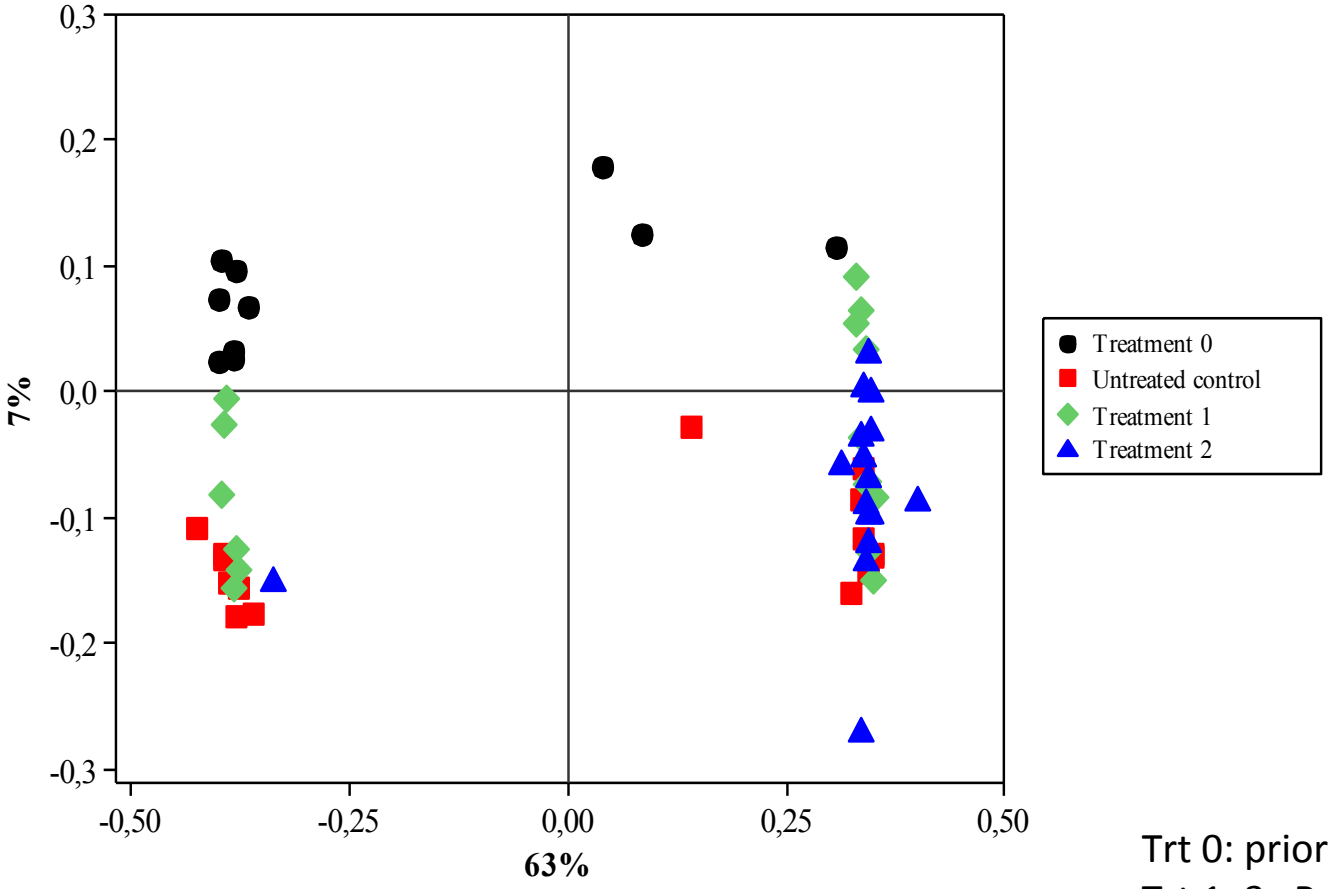


3x Revus Top +
4x Signum

2x Amistar

Firuz Odilbekov, SLU, Alnarp

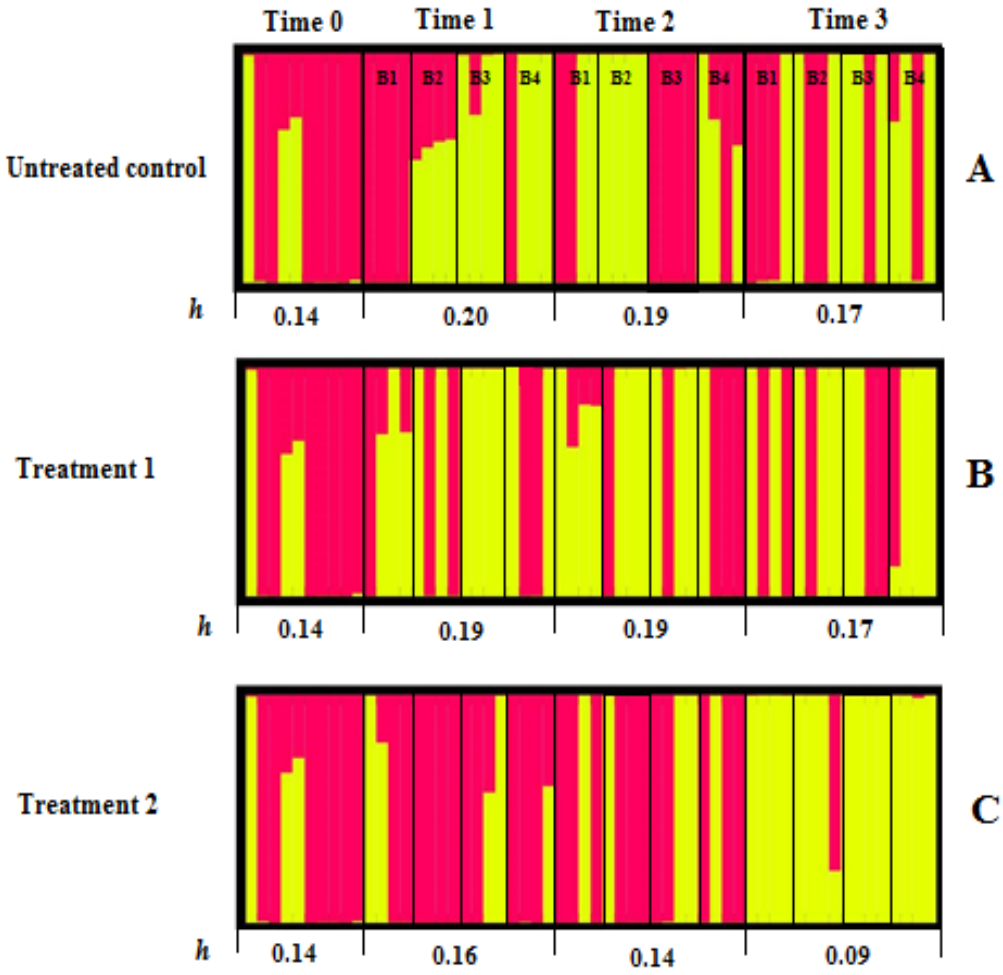
Within season change in population structure?
AFLP-markers
PCoA-analysis



Trt 0: prior to treatment
Trt 1: 3x Revus Top +
4x Signum
Trt 2: 2x Amistar

Firuz Odilbekov, SLU, Alnarp

AFLP-markers
Structure analysis



Trt 0: prior to treatment
Trt 1: 3x Revus Top +
4x Signum
Trt 2: 2x Amistar

Firuz Odilbekov, SLU, Alnarp

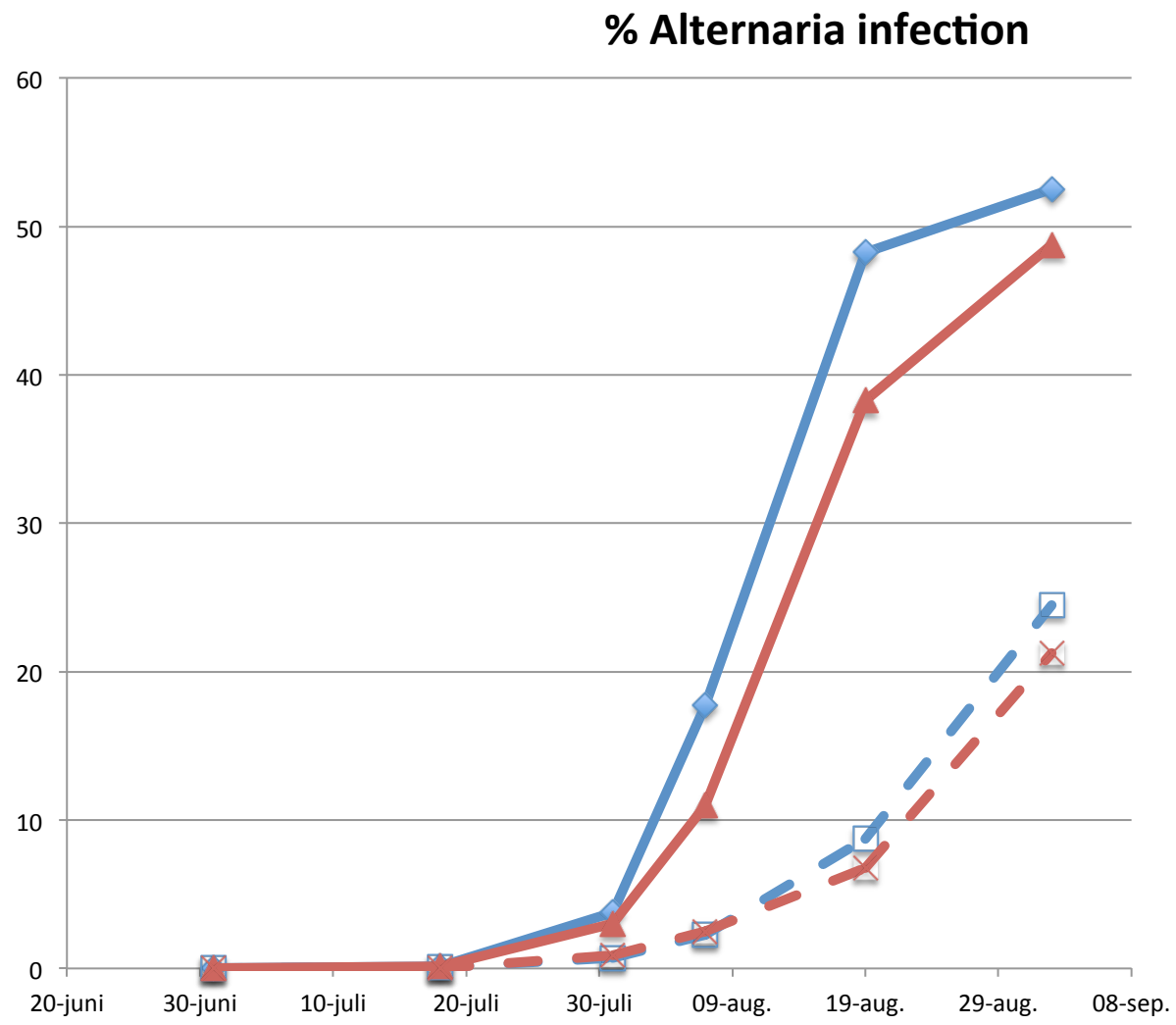
Trial 2, 2014

Cultivar, dose, timing (±RevusTop)

Two starch cultivars:
Kuras and Kardal

		Doses L/ha									
	Treatment No:	1	2	3	4	5	6	7	8	9	10
	Fungicide										
Control	Revus Top										
	Revus 250 SC	0,6	0,6								
	Ranman Top			0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	Signum										
Early start Full dose	Revus Top	**0,6**	**0,6**								
	Revus 250 SC										
	Ranman Top			0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	Signum			**0,25**		**0,25**		**0,25**		**0,25**	
Early start Half dose	Revus Top	**0,3**	**0,3**								
	Revus 250 SC	0,3	0,3								
	Ranman Top			0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	Signum			**0,125**		**0,125**		**0,125**		**0,125**	
Late start Full dose	Revus Top										
	Revus 250 SC	0,6	0,6								
	Ranman Top			0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	Signum				**0,25**		**0,25**		**0,25**		**0,25**
Late start Half dose	Revus Top										
	Revus 250 SC	0,6	0,6								
	Ranman Top			0,5	0,5	0,5	0,5	0,5	0,5	0,5	0,5
	Signum				**0,125**		**0,125**		**0,125**		**0,125**

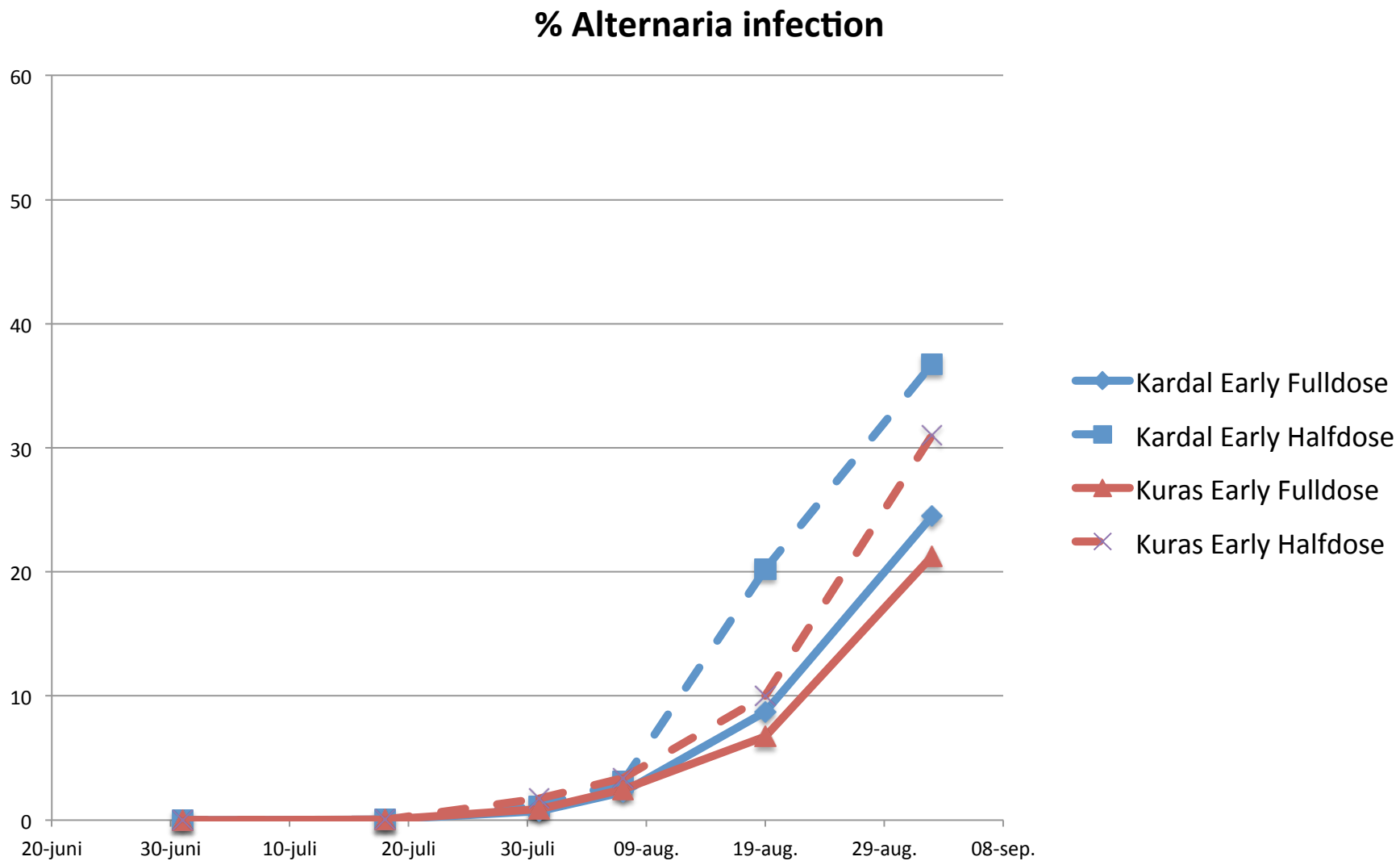
Cultivar



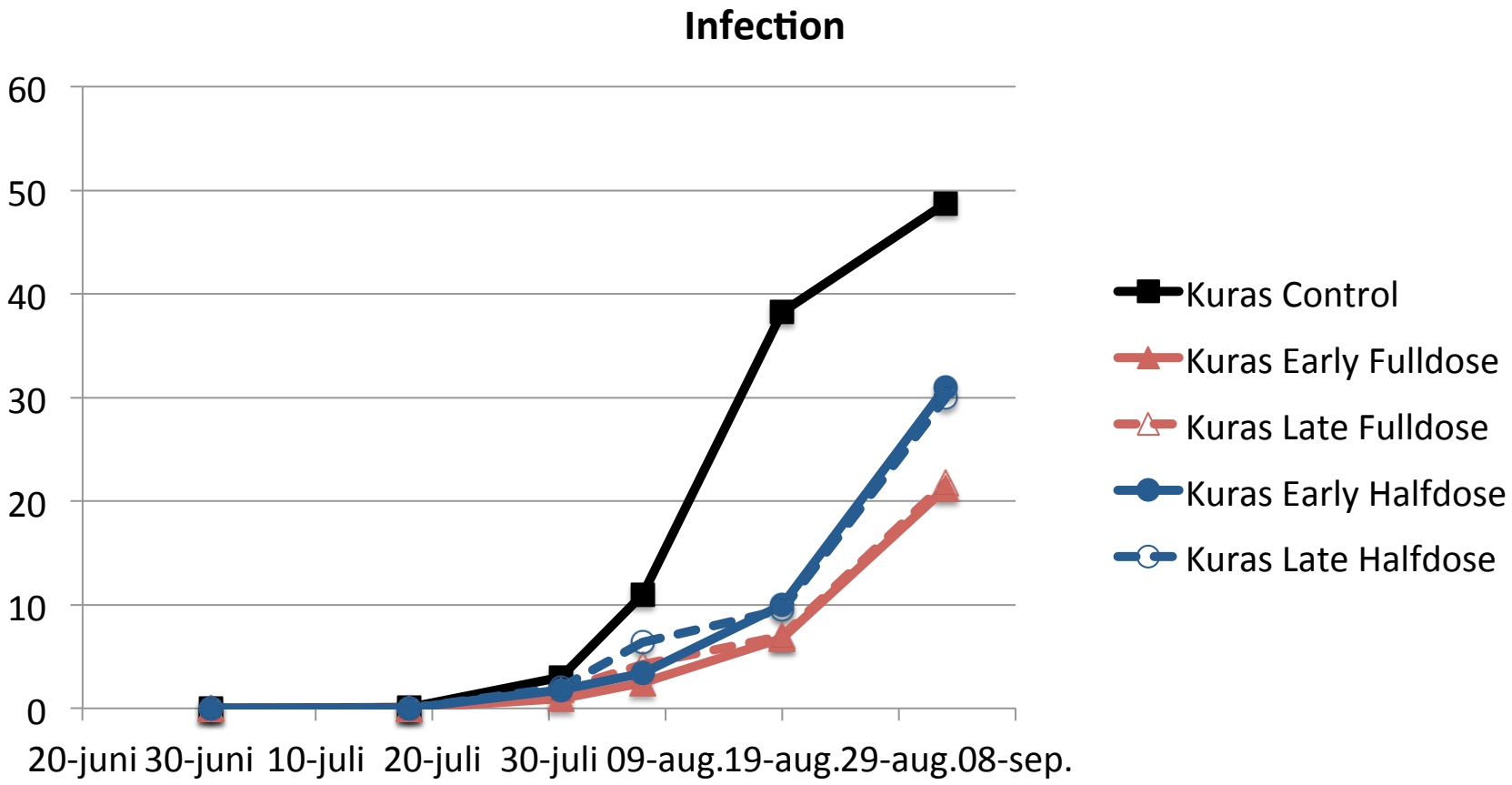
Revus Top: 16/6 and 21/6

Signum: 30/6, 15/7, 28/7 och 11/8

Dose

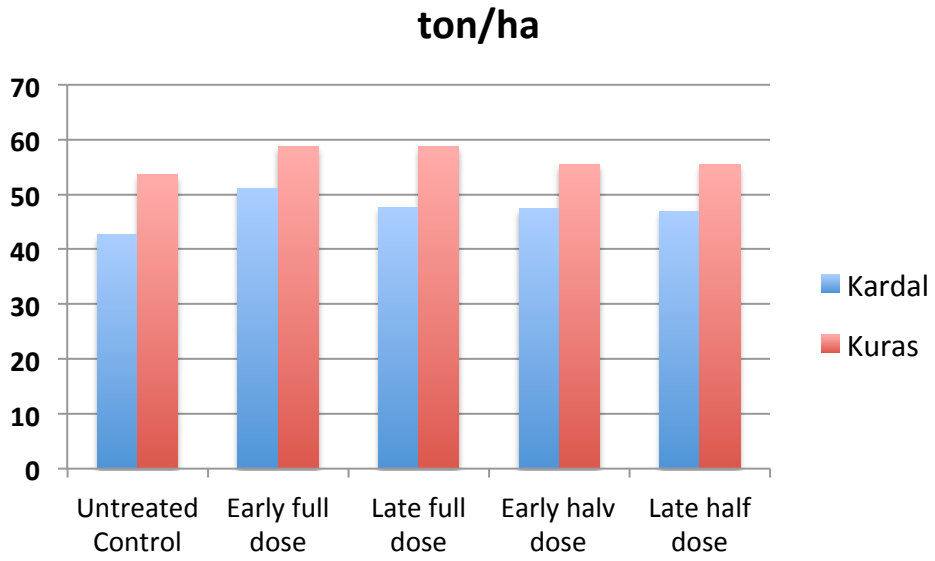

% Alternaria infection
60
50
40
30
20
10
0
20-juni
30-juni
10-juli
20-juli
30-juli
09-aug.
19-aug.
29-aug.
08-sep.
Kardal Early Fulldose
Kardal Early Halfdose
Kuras Early Fulldose
Kuras Early Halfdose

Timing, ±
Revus Top



Same pattern for
cv. Kardal

Yield Alternaria trial Nymö 2014



Source	DF	F Value	Pr > F
Cultivar	1	64.53	<.0001
Dose	1	6.42	0.0185
Time	1	0.80	0.3807
Block	3	4.16	0.0171
Cultivar*dose	1	0.20	0.6551
Cultivar*time	1	0.84	0.3689

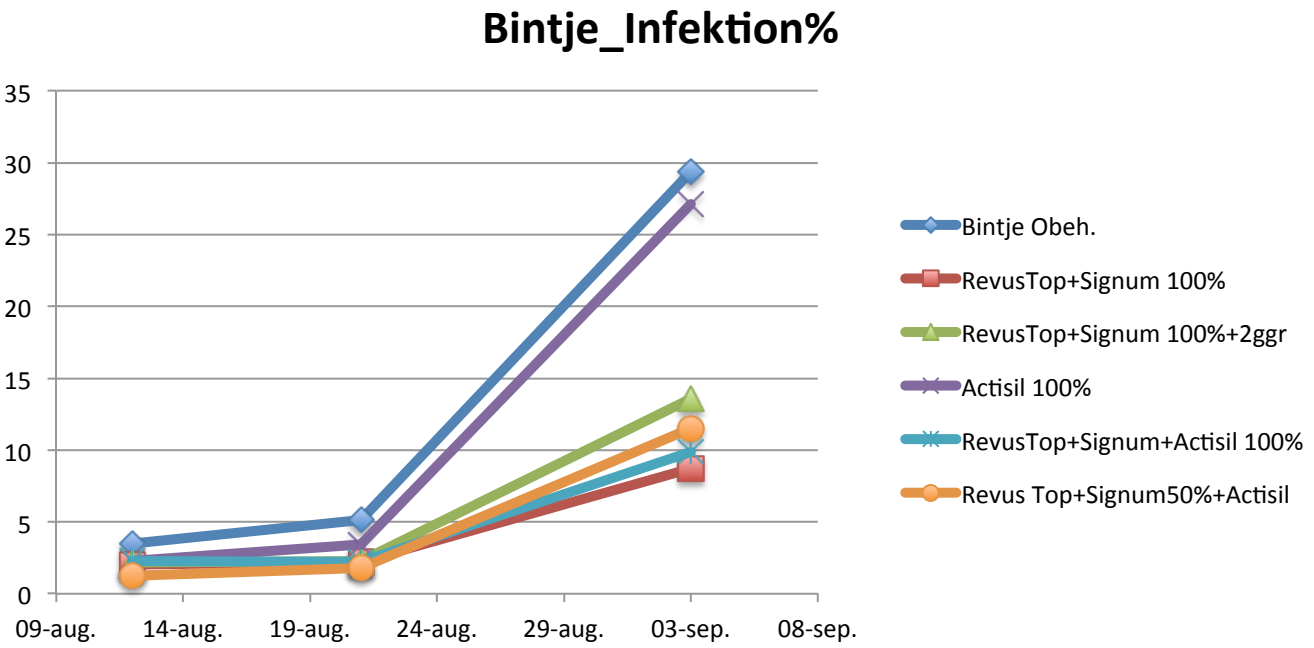
Alternaria trial Kristianstad (two farms) 2015
Late infections!

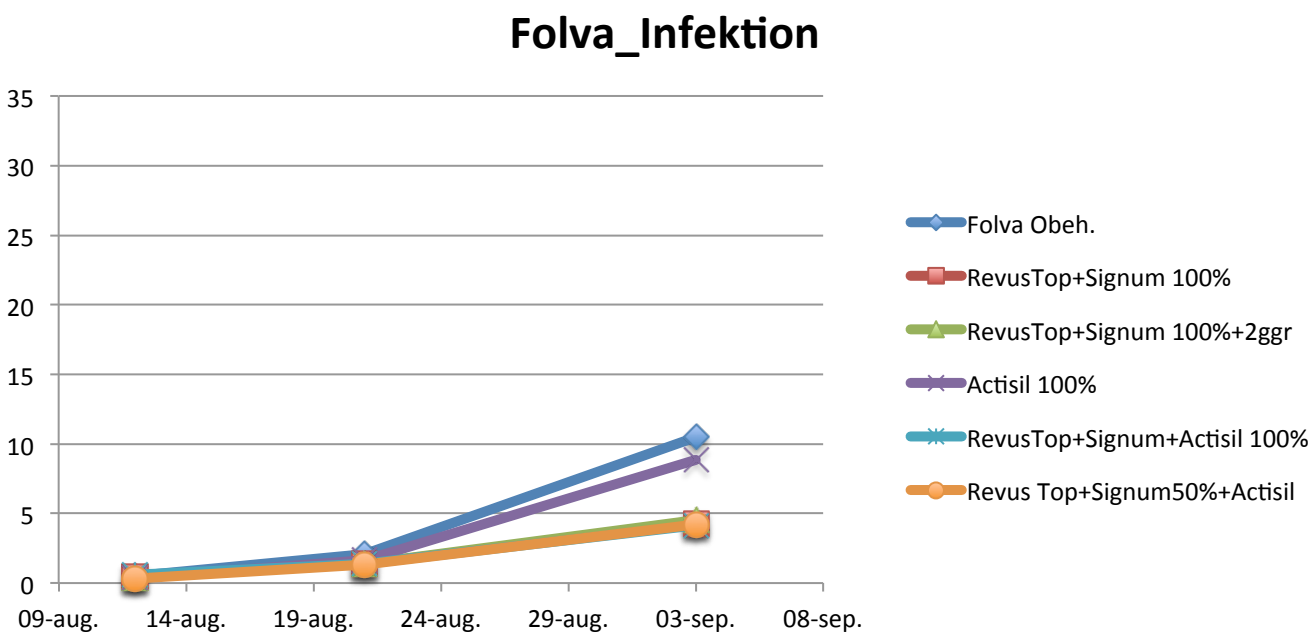
Alternaria Treatments

- **Fungicides**
- **Silicate**
- **Combination**

Results from 2015

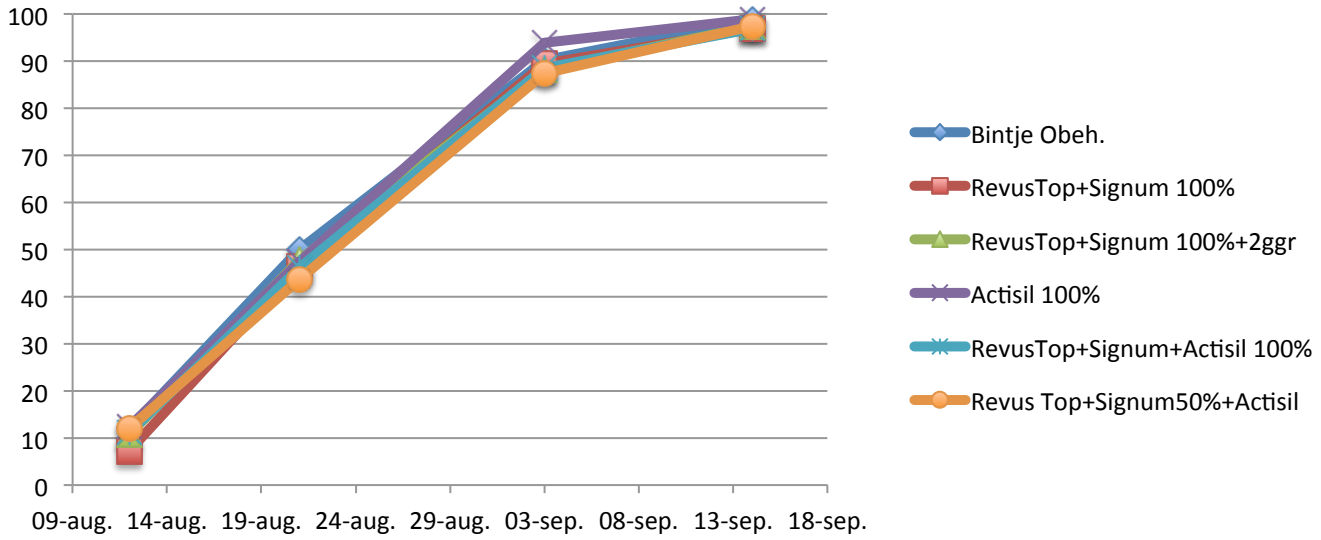
Two cultivars



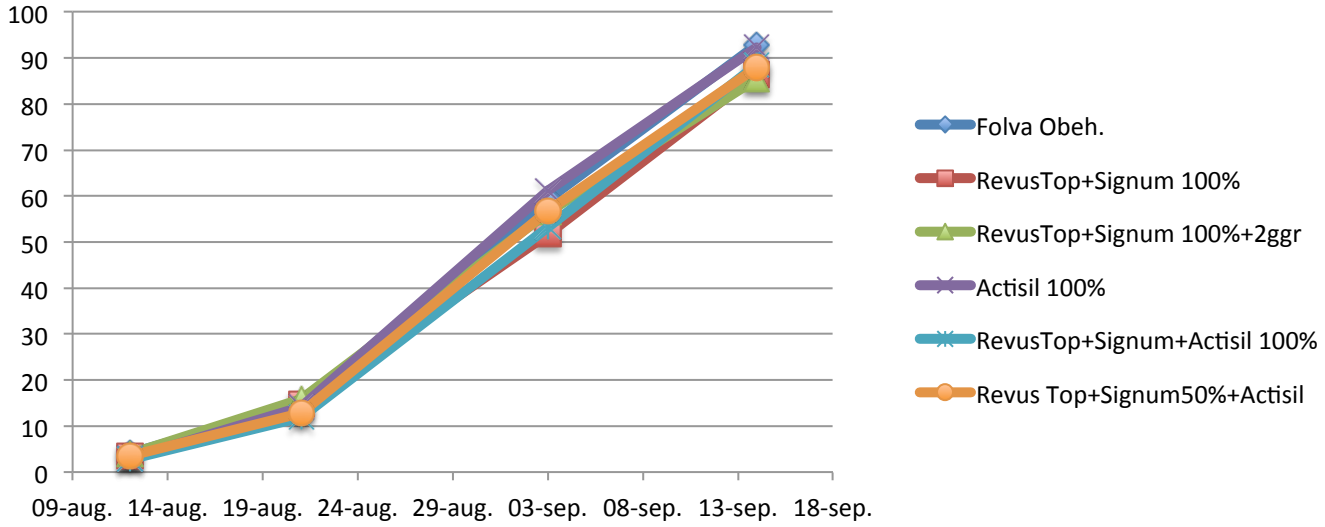


Results från 2015

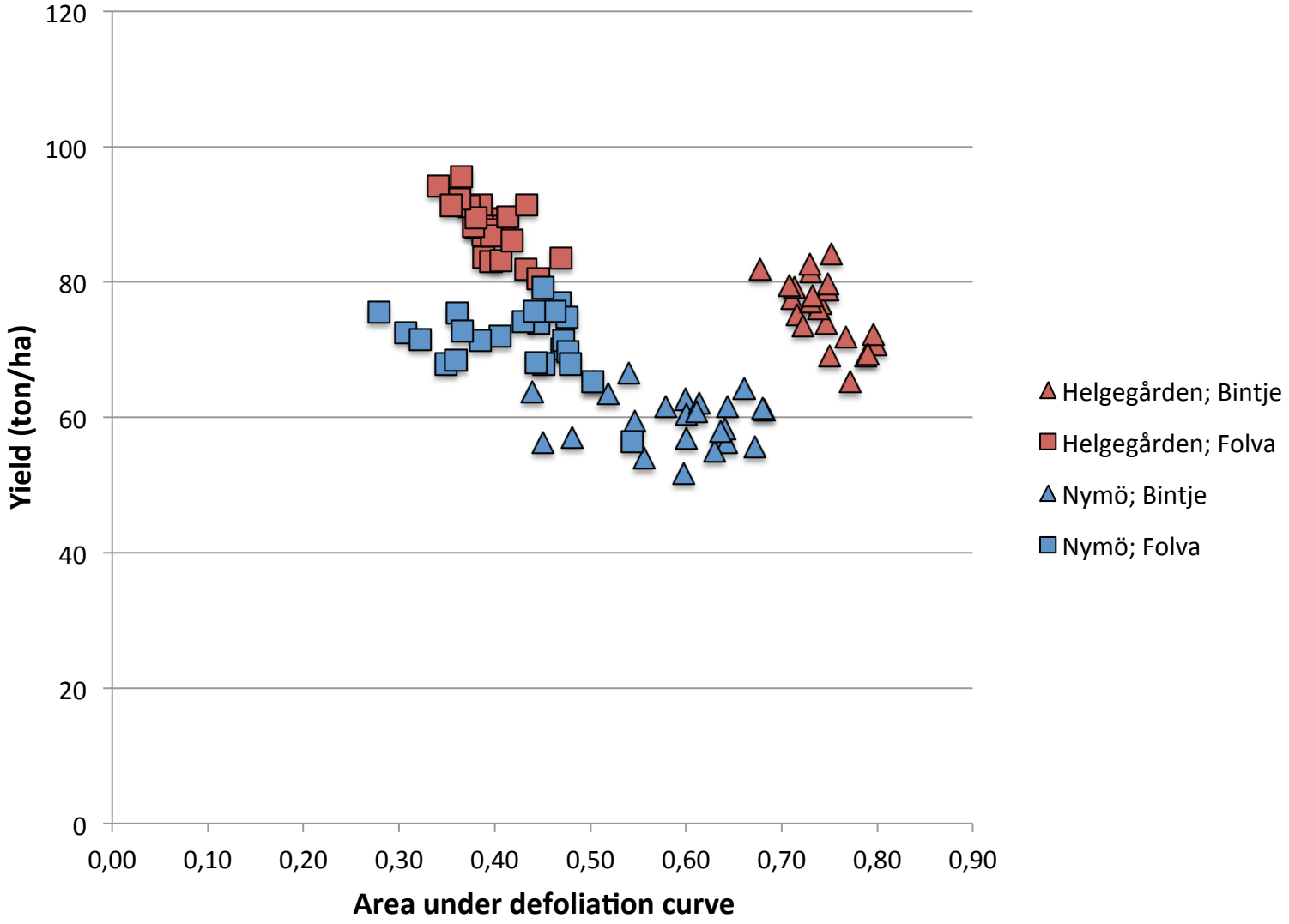
Bintje_Defoliation



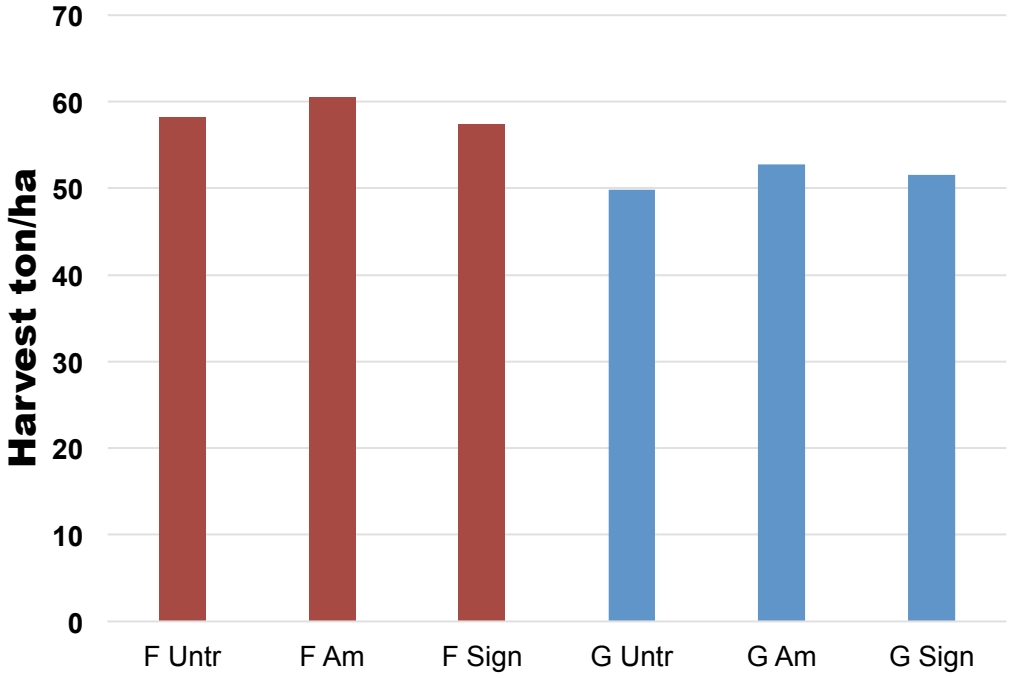
Folva_Defoliation rate



Results 2015
Yield – Effect of field site and cultivar



Field trial 2015
Western Sweden



Cv Fakse och Gala
Untreated
2x Amistar 0.5 L
4x Signum 0.25 L

Very low infection 3 Sep
Senescence Fakse 10-80%
Senescence Gala 10-80%
New field trial 2016

Field trial 2015
Western Sweden

Treatment	GIwt	GI(CTC)	GIIwt	GII(TTA))
Fakse, untr	2	0	2	3
Fakse, tr1	3	0	0	2
Fakse, tr2	0	0	1	4
Gala, untr	1	0	1	4
Gala, tr1*	0	6	0	6
Gala, tr2	0	0	1	2

N=8 treatment^{-1}

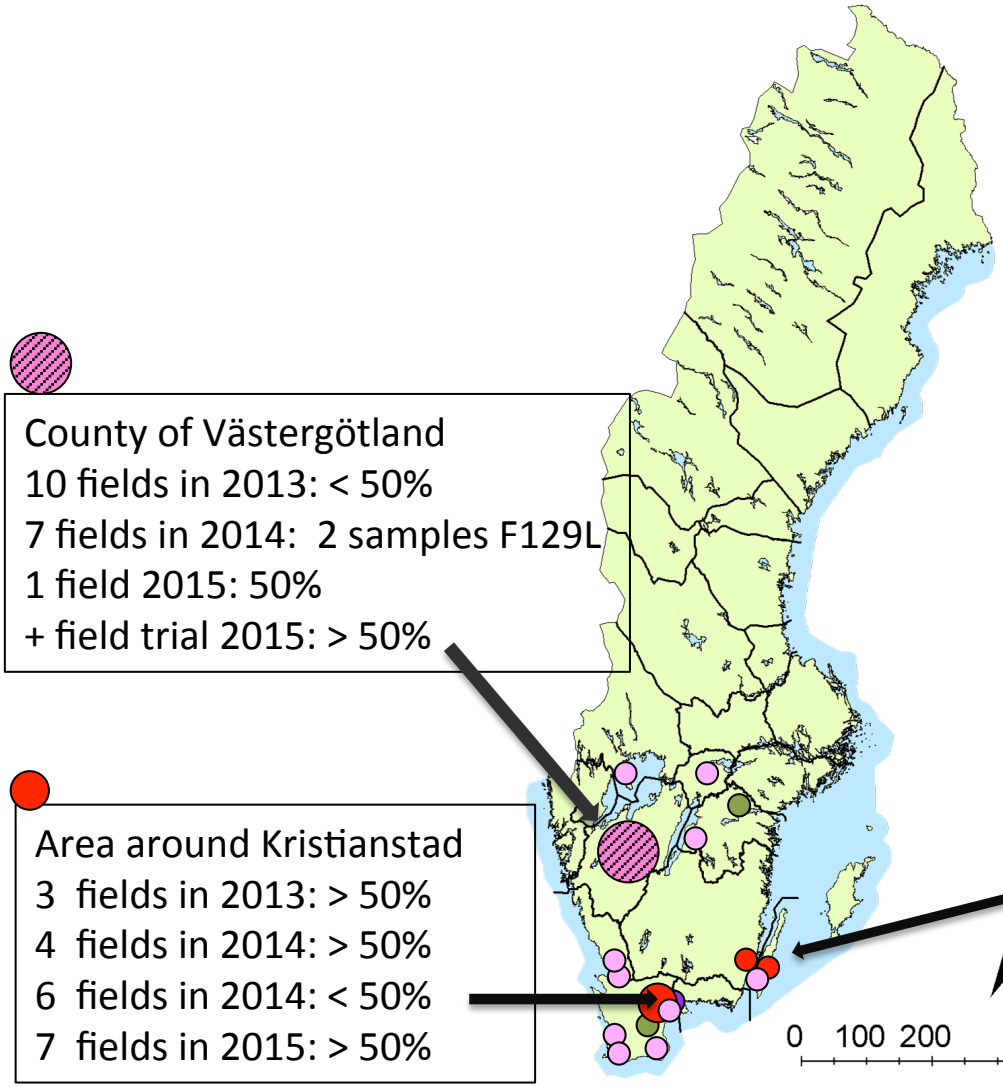
*** 4 samples GI(CTC) + GII(TTA)**

Cv Fakse och Gala
Untreated
Tr1: 2x Amistar 0.5 L
Tr2: 4x Signum 0.25 L

Very low infection 3 Sep
Senescence Fakse 10-80%
Senescence Gala 10-80%
New field trial 2016

Occurrence of F129L in *A. solani* in Sweden

analysis of leaf samples 2013-2015



County of Västergötland
10 fields in 2013: < 50%
7 fields in 2014: 2 samples F129L
1 field 2015: 50%
+ field trial 2015: > 50%

Area around Kristianstad
3 fields in 2013: > 50%
4 fields in 2014: > 50%
6 fields in 2014: < 50%
7 fields in 2015: > 50%

Area around Kalmar
3 fields in 2013: > 50%
4 fields in 2014: > 50%
3 fields in 2015: > 50%
S. nigra 2015: > 50%

< 50% GI F129L CTC

≤ 50% GII F129L TTA

> 50% GII F129L TTA

Eva Edin

Norway N=8 field^{-1}

Field	GIwt	GI(CTC)	GIIwt	GII(TTA))
Rygge	0	0	3	5
Råde	0	0	0	0
Gjerstad	1	0	3	4
Naess	0	0	1	4
Solheim*	0	4	0	6

* 3 samples GI(CTC) + GII(TTA)

Finland N=8 field^{-1}

Field	GIwt	GI(CTC)	GIIwt	GII(TTA))
Kokemäki[1]	6	0	2	6
Isokyrö*	5	0	4	2
Köyliö *	4	0	2	3
Field 5	0	0	1	4
Field 6	0	0	3	2

[1] 1 sample GIwt + GII wt_
4 samples GIwt+ GII(TTA)
* 2 samples GIwt + GII wt_

Åland N=8 field^{-1}

Field	GIwt	GI(CTC)	GIIwt	GII(TTA))
Finströa	0	0	0	7
Hammarland	0	0	2	6
Saltvik	0	0	2	6

Map borrowed from
www.mitsubishielectric.se