

# Reduced fungicide input in late blight control (REDUCE 2007-2011)

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# Exploiting host resistance in the haulm to reduce the fungicide input.



- Field trials at 2 locations per year with inoculated spreader rows
- Varieties (resistance in haulm and tubers):
  - Asterix (3-7)
  - Saturna (5-6)
  - Peik (7-7)
- Preventive treatments according to VIPS, protection period is 5-7 days (5 days protection period if 4 or more blight risk days)
  - Host resistance and risk adjusted dose
  - Full dose
  - Control, untreated



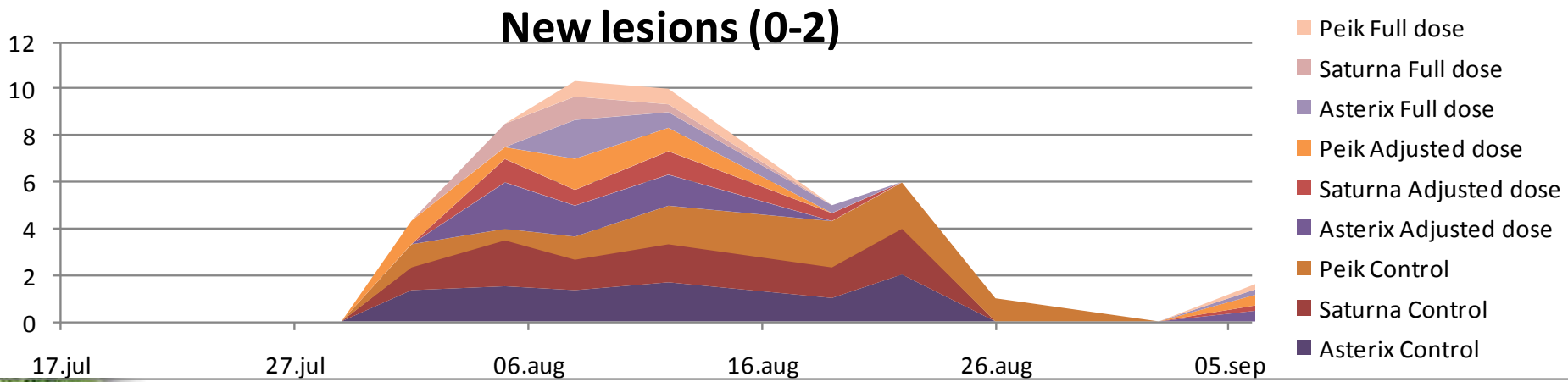
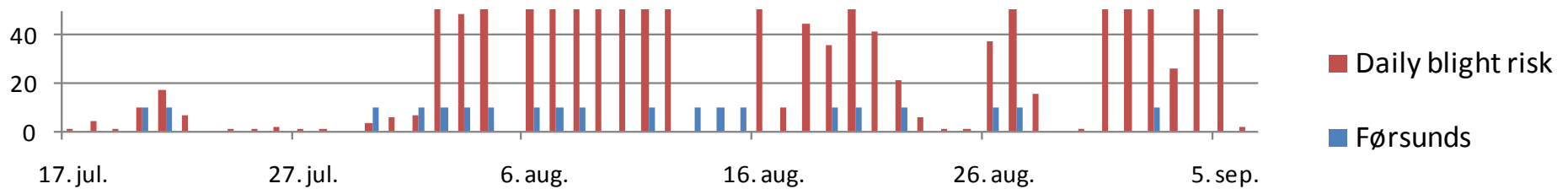
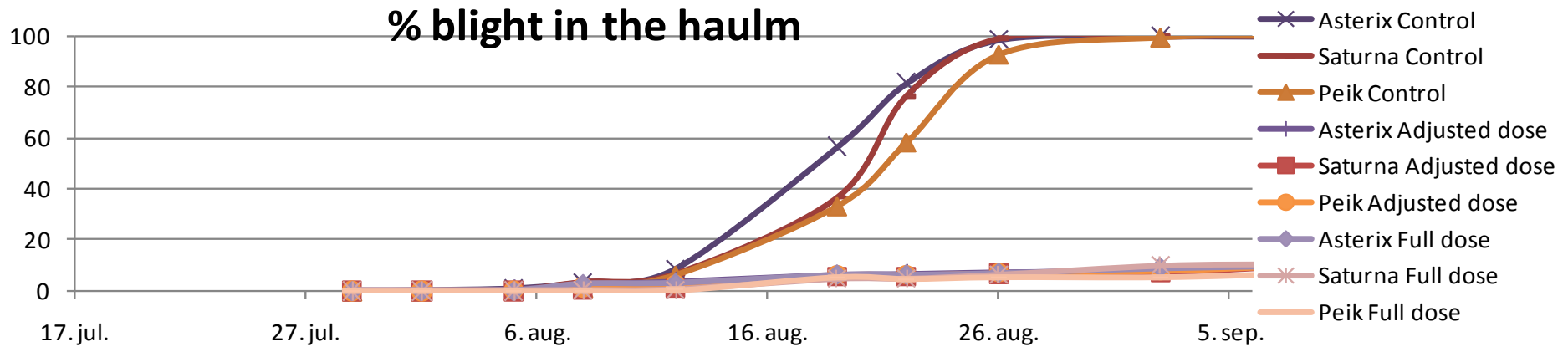
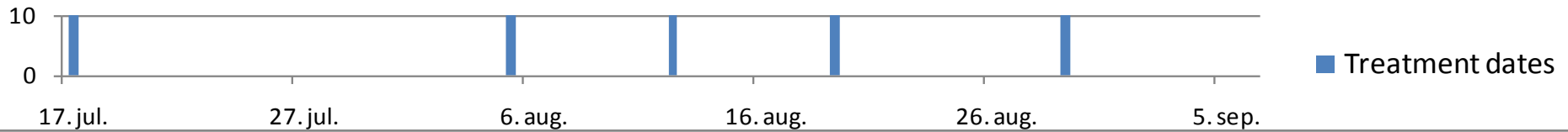
# Adjusting dose to host resistance and risk



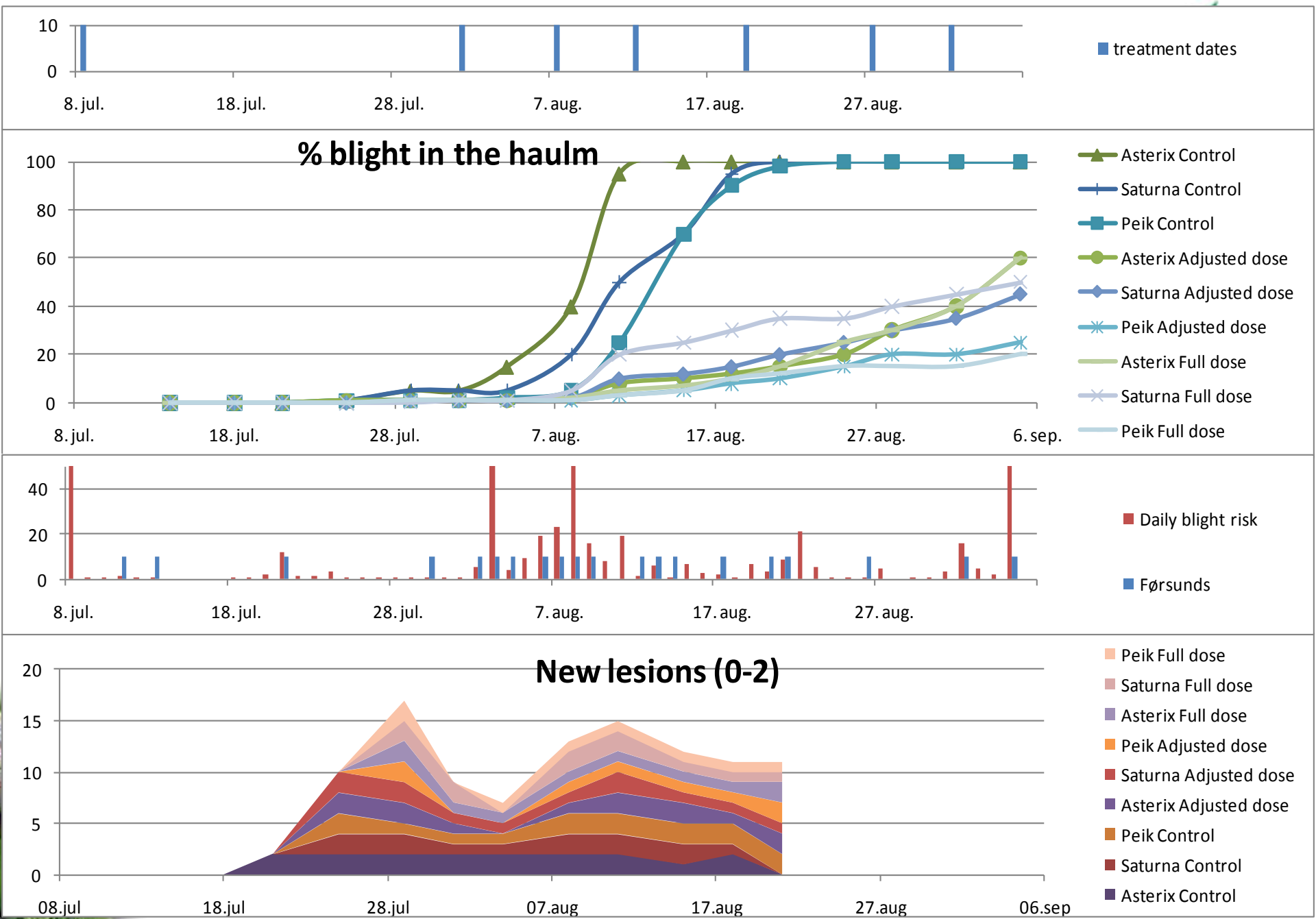
Variety (resistance)	Number of days with warning (to day and tomorrow) at <a href="http://www.vips-landbruk.no">www.vips-landbruk.no</a>	Consecutive days with more than 1 mm rain the next 5 days at <a href="http://www.yr.no">www.yr.no</a>	Dose %
Astrix (3)	1	0-1	75
		2 or more	88
	2	0-1	100
		2 or more	100
Saturna (5)	1	0-1	50
		2 or more	75
	2	0-1	75
		2 or more	100
Peik (7)	1	0-1	25
		2 or more	50
	2	0-1	50
		2 or more	75



# Solør 2008

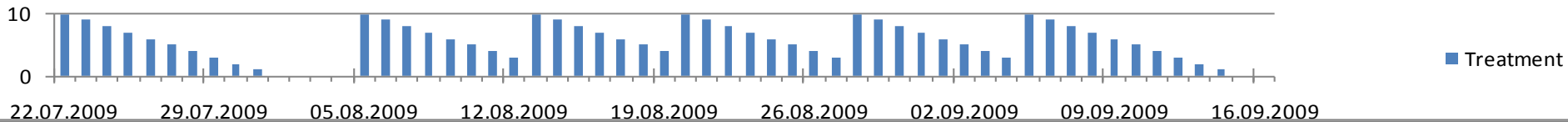
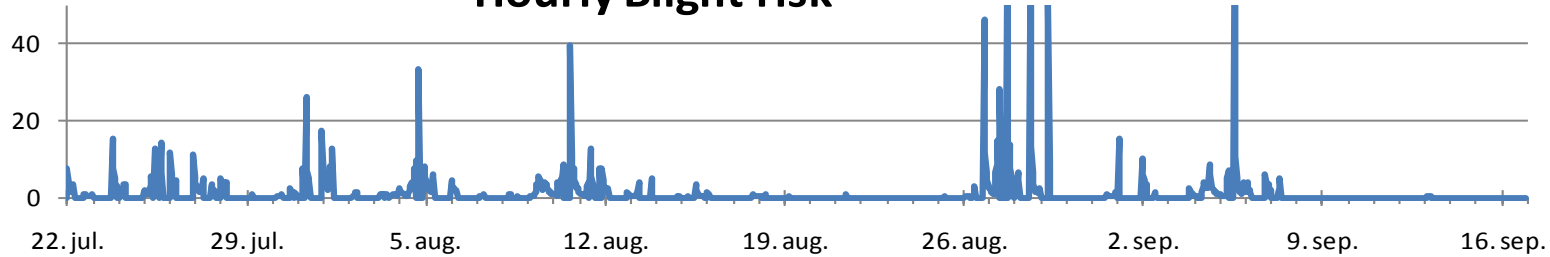


# Rygge 2008

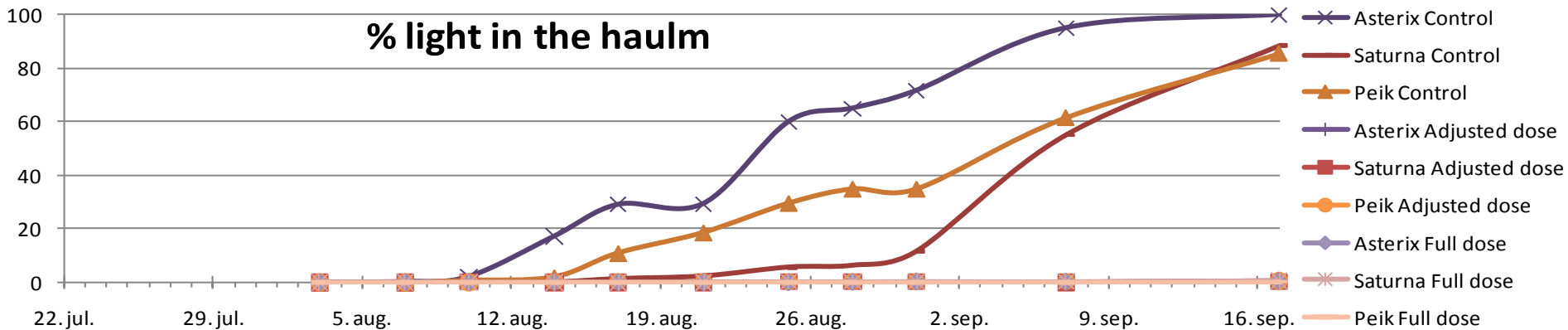


# Solør 2009

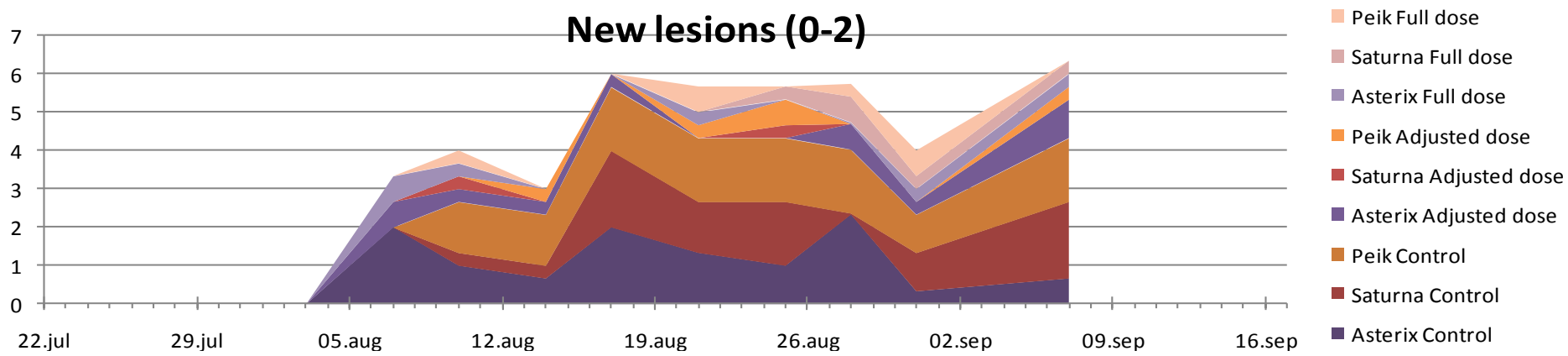
## Hourly Blight risk



## % light in the haulm

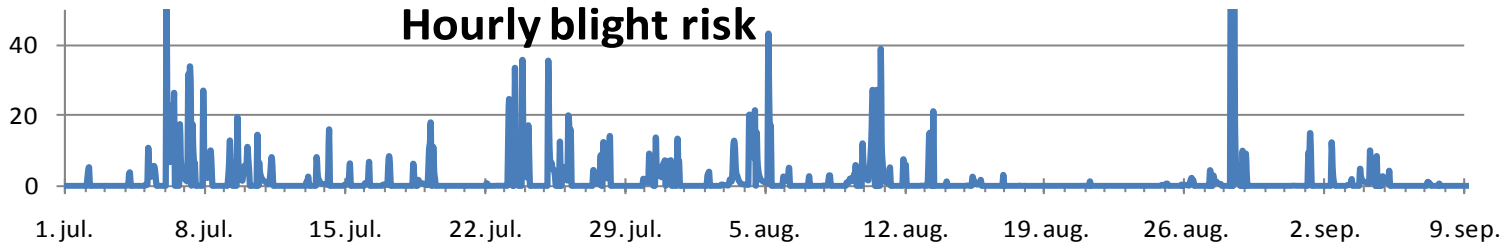


## New lesions (0-2)

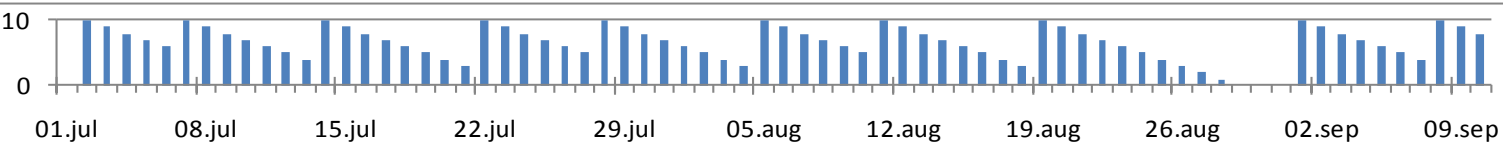


# Rygge 2009

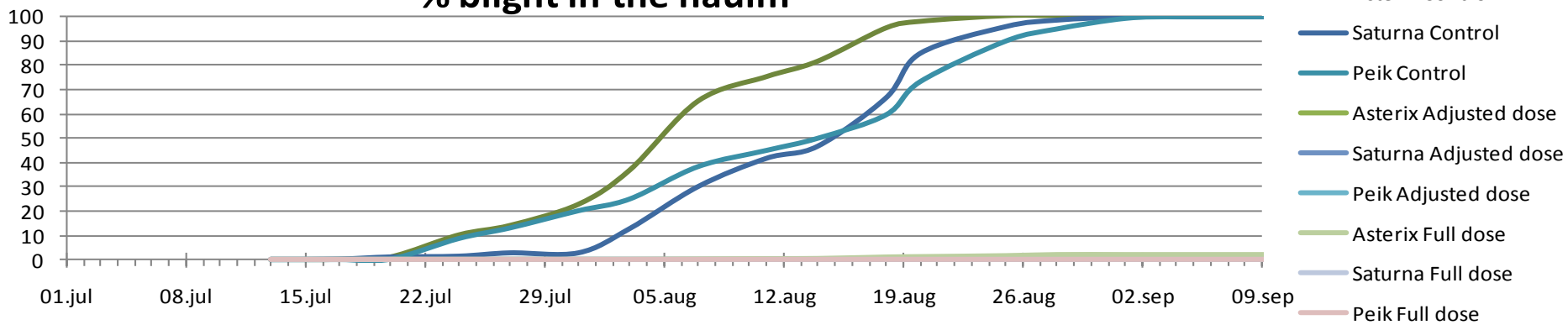
## Hourly blight risk



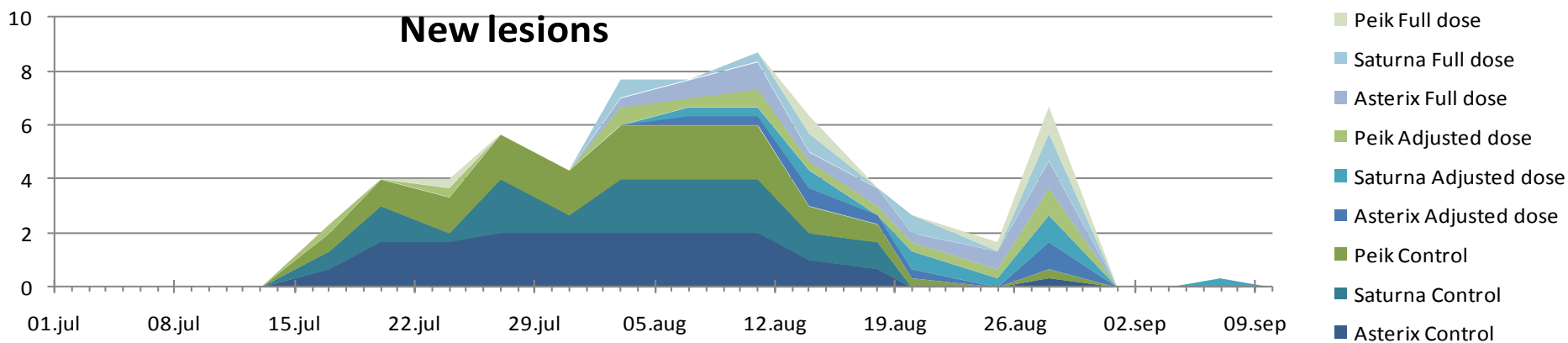
## Treatments



## % blight in the haulm



## New lesions



Fungicid reduction: full dose <> adjusted dose

- **Low resistance (Asterix) : 6% -19%**
- **Medium resistance (Saturna): 17% - 36%**
- **High resistance (Peik): 42% - 61%**



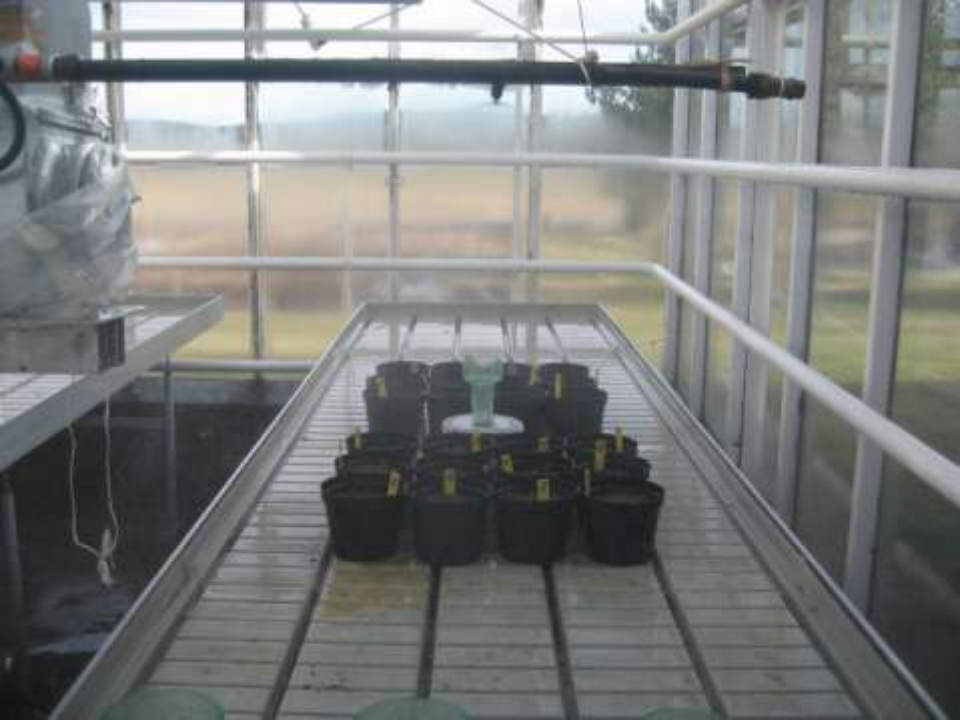


# Wash down of spores in soil



- 2 soil types: Silt and light clay
- 2 spore concentration: 50 or 500.000 spores/liter soil
- 3 irrigation regimes: 5, 10 og 15 mm
- 3 replications + negative controls
- $2 \times 2 \times 3 \times 3 + 6 = 42$  pots
  
- Lacey test for 2 soil depths: 0 cm and 4 cm
- Number of Lacey tests:  $78 \times 80 = 6240$  octants







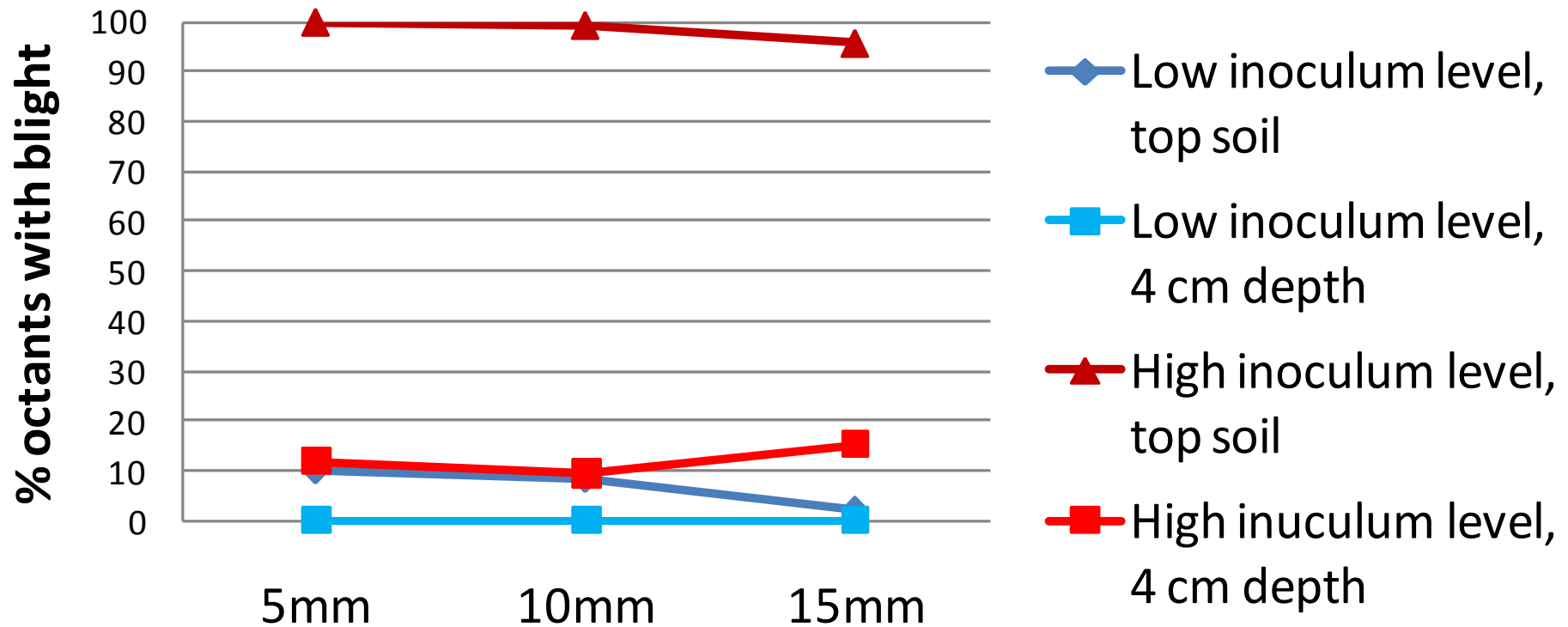
Top soil



4 cm depth



## Wash down of spores in soil



Conclusion:

Most of the spores remains in the top soil



# Tuber blight resistance at different maturity



- **Varieties (resistance in haulm and tubers)**
  - Kerrs Pink(6-3)
  - Saturna(5-6)
  - Troll(6-8)
- **4 harvest dates**
- **10 samples pr variety at each harvest**
  - 5 samples were wounded
  - 5 samples unwounded
- **4 inoculum mixes (20 ml of 10.000 spores/ml )+ controls**

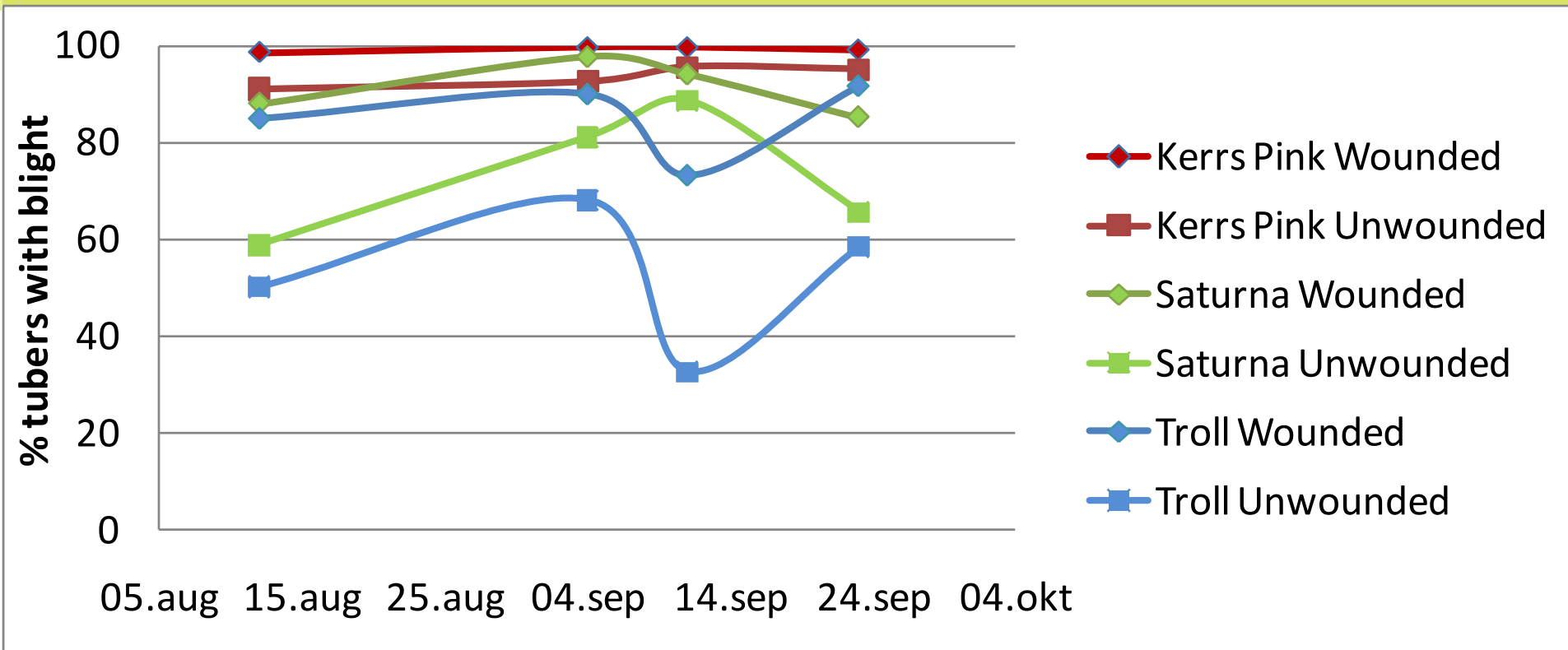












## Conclusions:

More attacks by wounding.

More attacks at low resistance in tubers.

No effect of maturity.



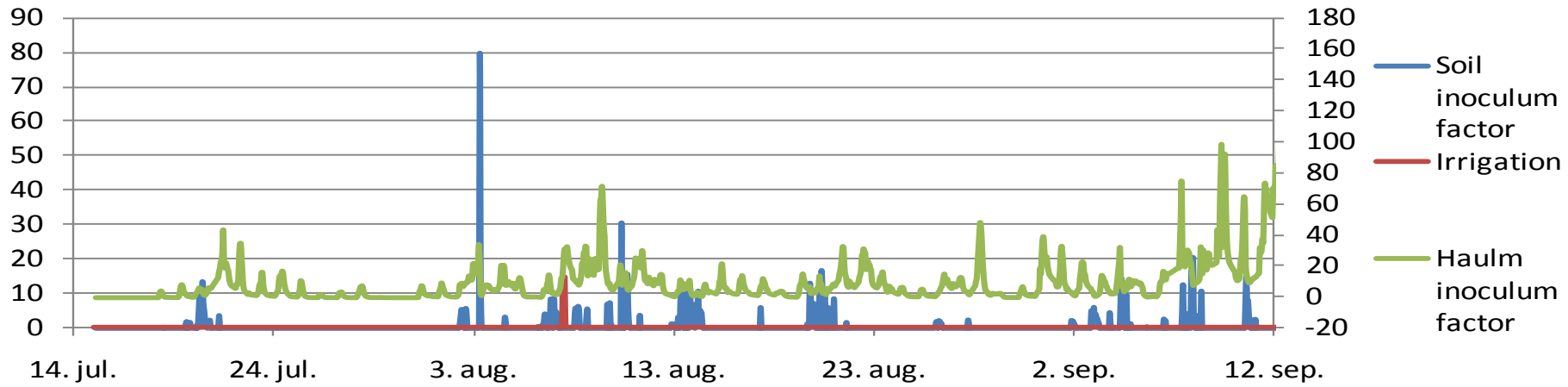


## Testing of tuber blight model

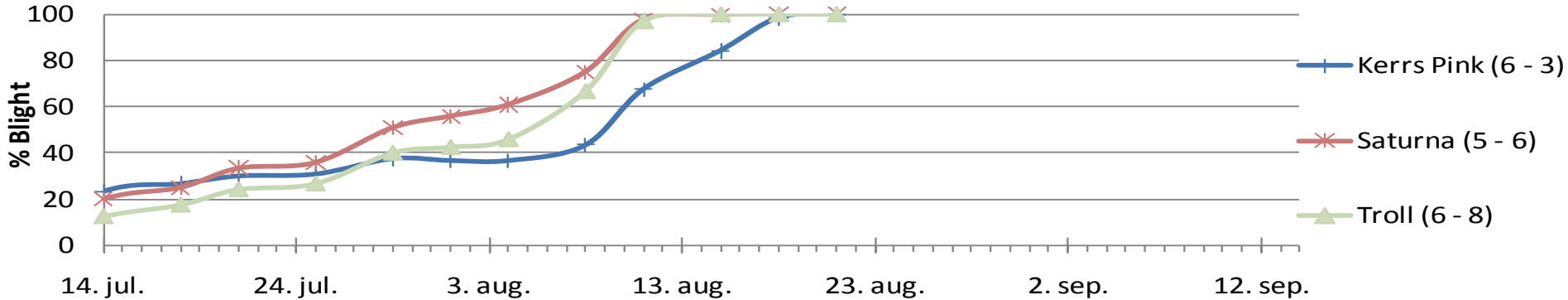
- Soil inoculum factor = Haulm inoculum factor \* rain
- 2 locations with artificially inoculated fields pr year
- Varieties (resistance in haulm and tubers)
  - Kerrs Pink(6-3)
  - Saturna(5-6)
  - Troll(6-8)
- Irrigation at critical dates
  - Irrigation
  - No irrigation
- 4 harvest dates



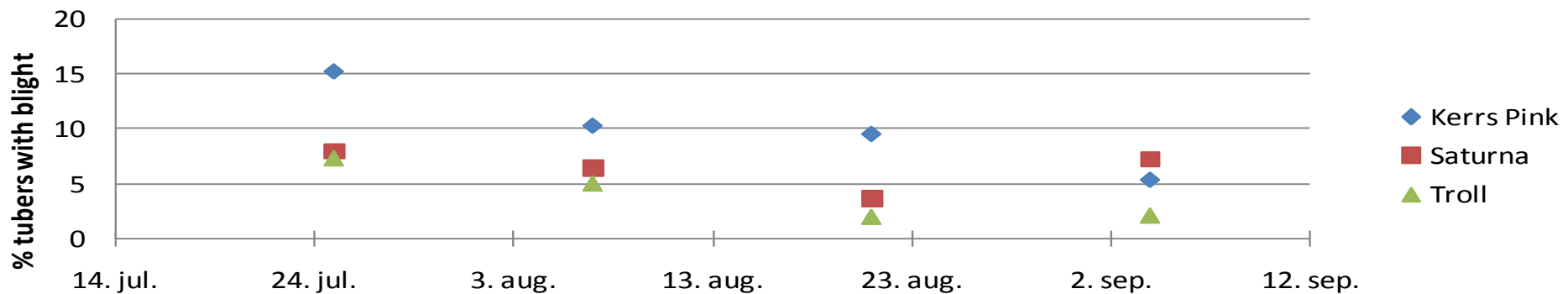
### Soil inoculum factor, Rygge 2008



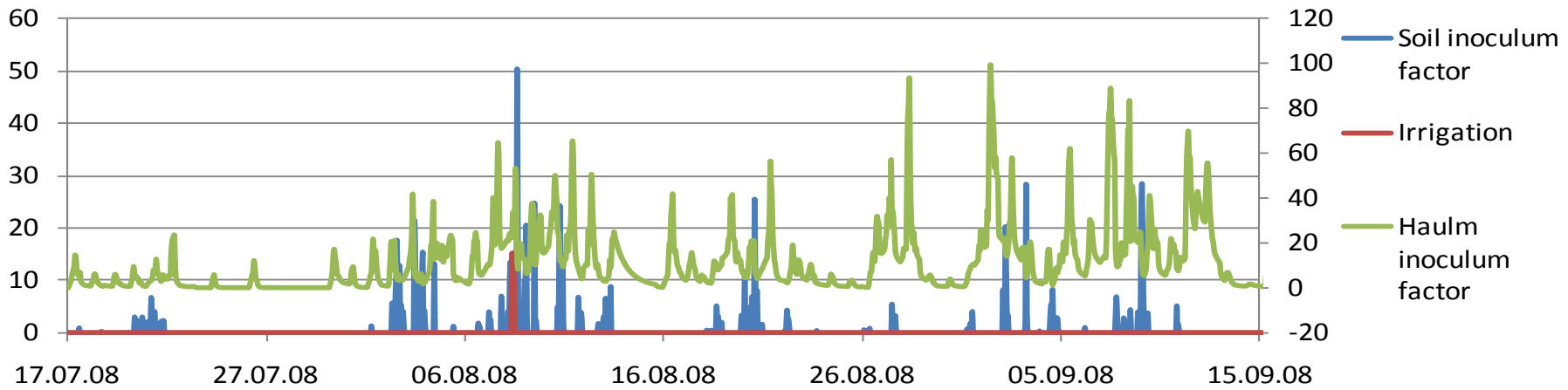
### % Blight in the haulm, Rygge 2008



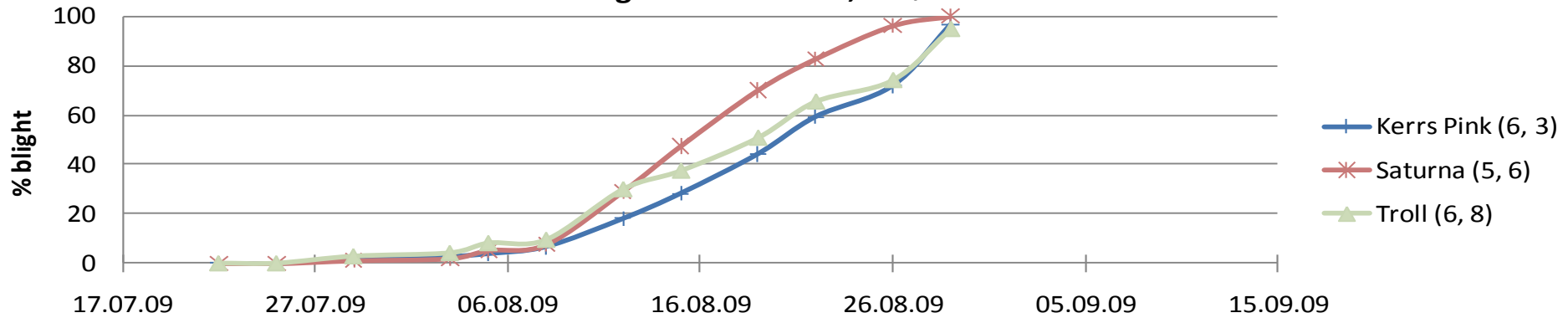
### % Tubers with blight, Rygge 2008



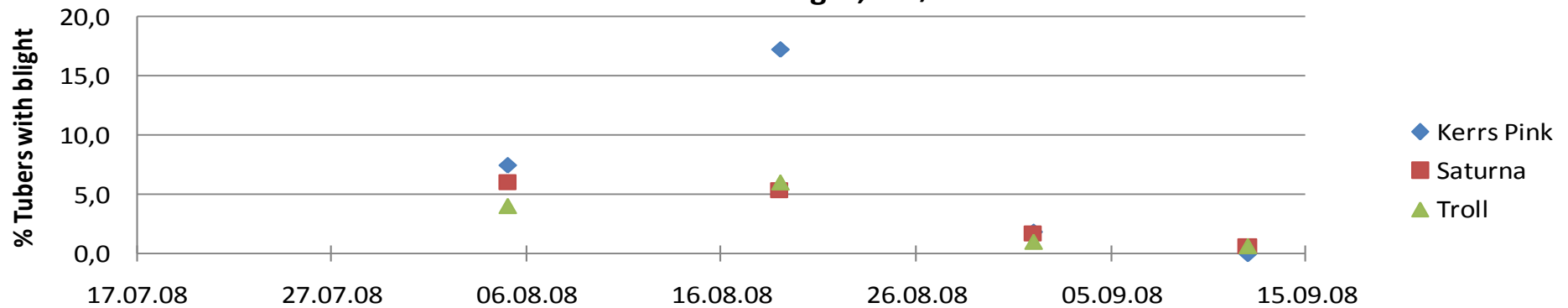
### Soil inoculum factor Solør 2008



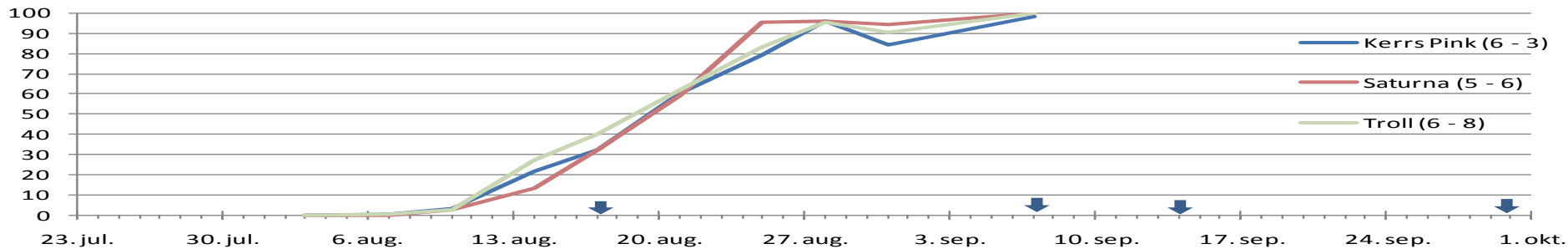
### % Blight in the haulm, Solør 2008



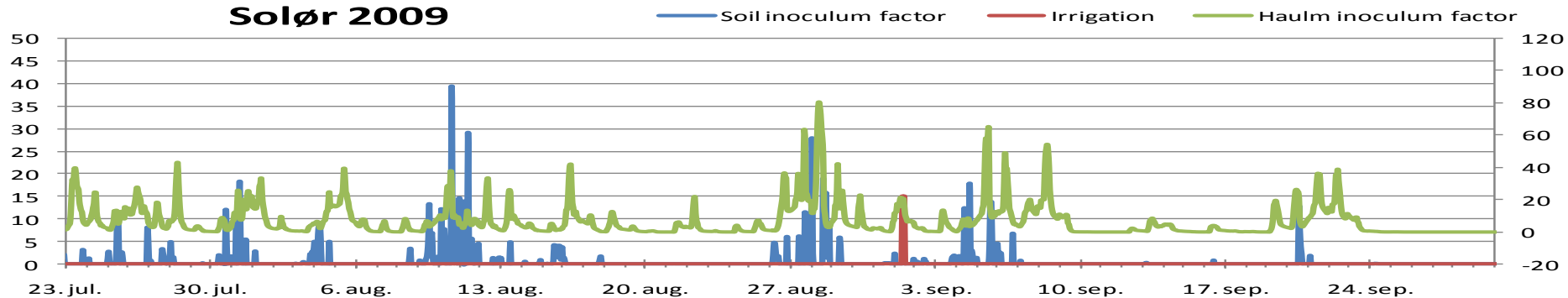
### % Tubers with blight, Solør 2008



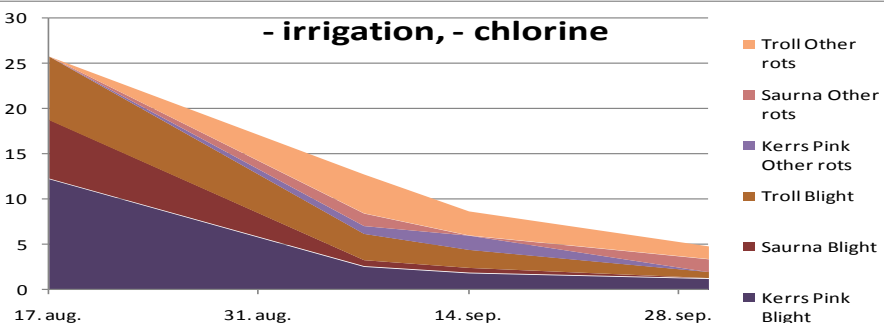
# % blight in the haulm, Solør 2009



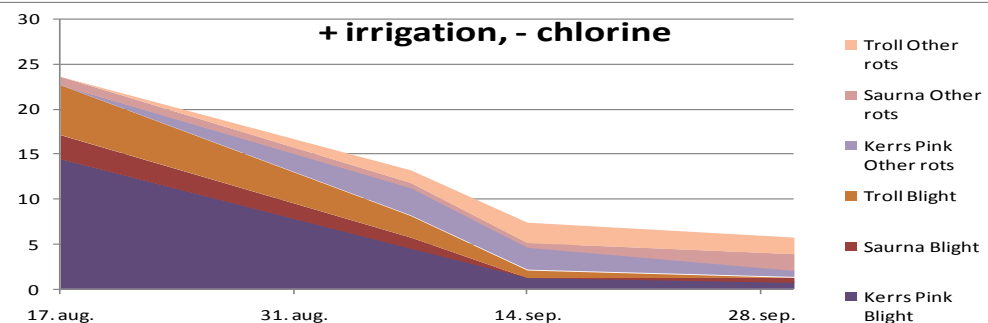
# Solør 2009



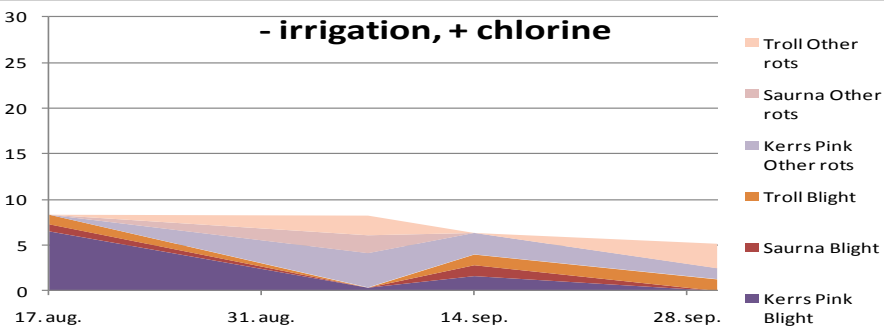
## - irrigation, - chlorine



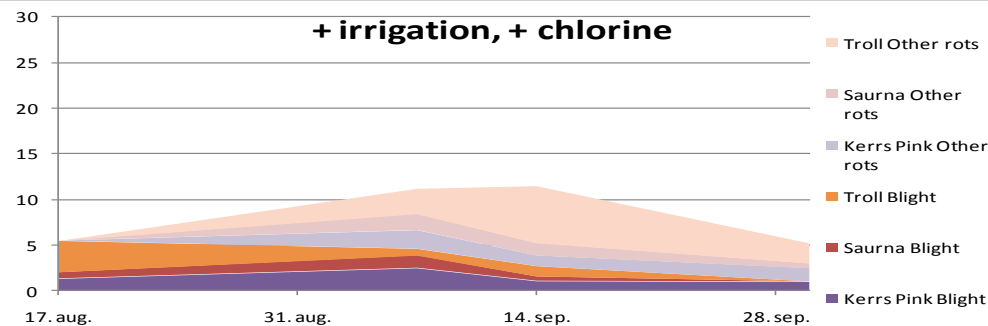
## + irrigation, - chlorine



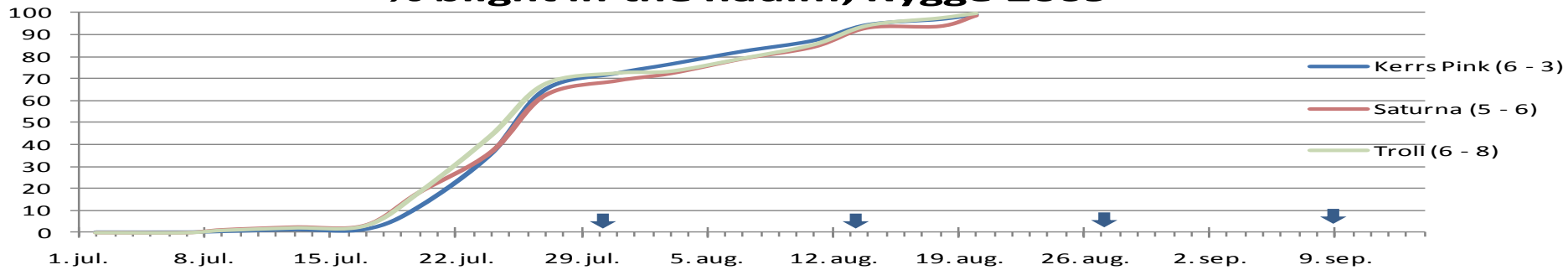
## - irrigation, + chlorine



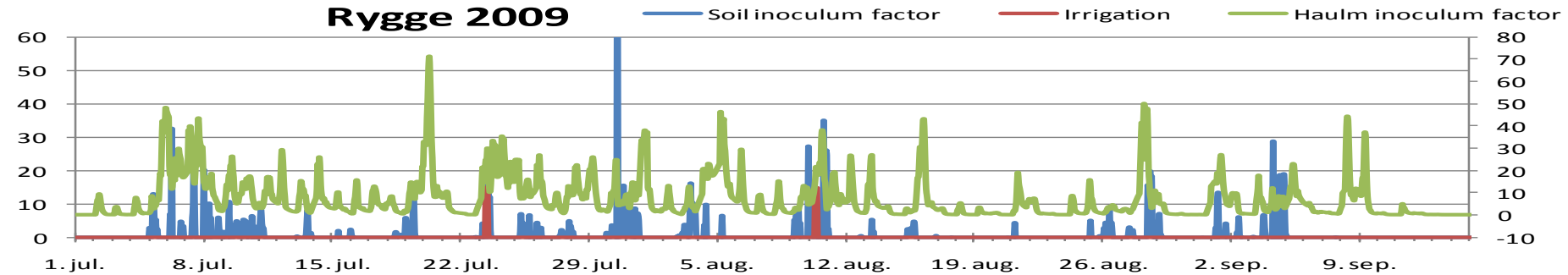
## + irrigation, + chlorine



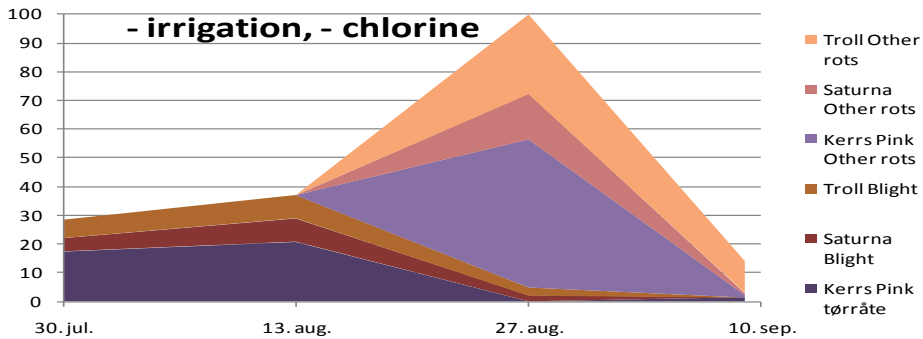
# % blight in the haulm, Rygge 2009



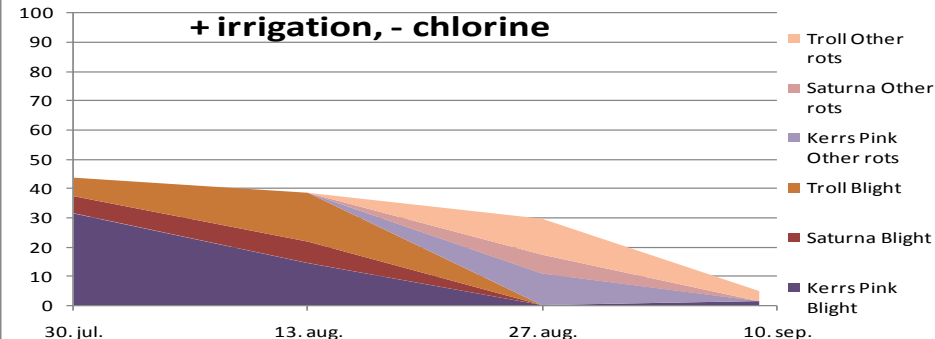
## Rygge 2009



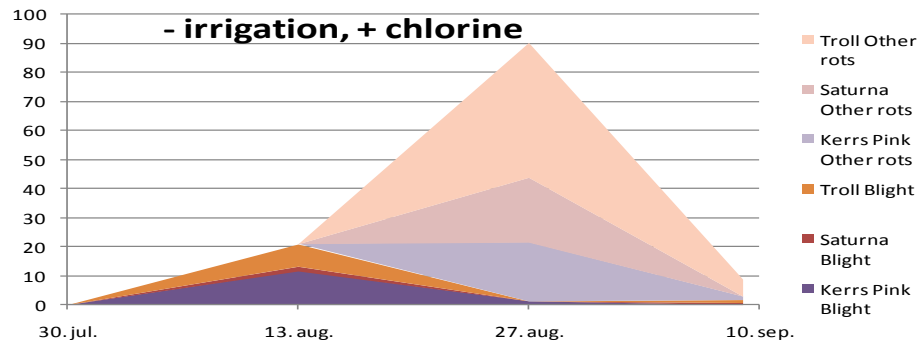
### - irrigation, - chlorine



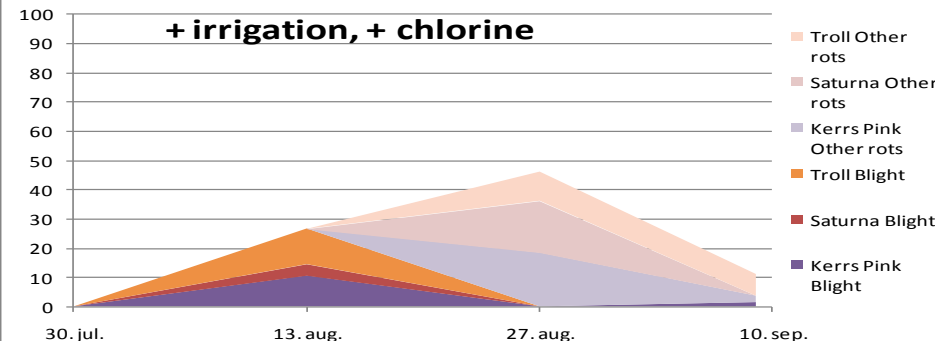
### + irrigation, - chlorine



### - irrigation, + chlorine



### + irrigation, + chlorine



# Conclusions

- There were less tuber blight after the haulm were killed by blight
- Tuber blight were mainly caused by infection at harvest

# Acknowledgement

- The field experiments were conducted by the Norwegian extension service groups at SørØst and Solør Odal

